

Environmental Assessment for Rehabilitating Facilities and Removing Low-water Crossing of Solstice Creek in Solstice Canyon

Santa Monica Mountains National Recreation Area Los Angeles County, California

The National Park Service is proposing a project to rehabilitate facilities at Solstice Canyon and replace a low-water crossing that precludes steelhead trout from accessing historic spawning grounds in Solstice Creek. The purposes of the project would be to enhance public health and safety, improve educational opportunities and visitor experience, and contribute to restoration of a spawning population of steelhead trout in Solstice Canyon.

This environmental assessment has been prepared in accordance with the National Environmental Policy Act to evaluate the impacts of the project on the human environment and provide an opportunity for the public to review and comment on the project.

Following public and agency review, the Director of the Pacific West Region will make a determination concerning whether or not the project would result in significant impacts on the human environment. If the project would not significantly impact the human environment, the Regional Director will issue a "Finding of No Significant Impact". If the project would significantly impact the human environment, the Regional Director will issue a "Notice of Intent" to prepare an environmental impact statement.

Comments on this environmental assessment should be postmarked by June 4, 2001, and should be addressed to:

Arthur Eck, Superintendent
Santa Monica Mountains National Recreation Area
401 West Hillcrest Drive
Thousand Oaks, California 91360
(805) 370-2341

SUMMARY

The National Park Service (NPS) is proposing to rehabilitate facilities at Solstice Canyon and replace a low-water (“Arizona”) crossing of Solstice Creek at Santa Monica Mountains National Recreation Area (Recreation Area). The purposes of the project are to enhance public health and safety; increase educational opportunities; enhance visitor experience; upgrade utilities; restore stream ecosystem functions and riparian habitat; and remove a significant barrier to steelhead trout (*Oncorhynchus mykiss*) migration as a critical step in the eventual re-establishment of this species into Solstice Canyon.

Existing facilities in Solstice Canyon have deteriorated and currently threaten public health and safety. For example, the foundation of the visitor contact station is unstable and separating from the buildings. In addition, the local waterline is corroded and presents a maintenance problem and potential source for bacterial contamination. Roads have deteriorated and the Arizona crossing is being undercut by Solstice Creek. Limited parking presents additional hazards to pedestrians who park on road shoulders to hike into the project area. Educational facilities also are limited at the Recreation Area, while demand has increased with population growth in southern California. Finally, the Arizona crossing of Solstice Creek has altered natural processes and its removal has been identified as an essential element in an interagency plan to restore a spawning population of steelhead trout in Solstice Creek.

The primary issues driving the proposed project include (1) threats to public health and safety; (2) limited educational/interpretive opportunities in Solstice Canyon; and (3) in-stream impediments to steelhead trout. To address these issues, the proposed project would replace two buildings near Solstice Creek with an open-air, educational shelter; upgrade the water system and bury the new waterline; construct new restrooms and an informal amphitheater; reconfigure the parking lot; resurface roads; reconstruct the entrance gate; and replace the Arizona crossing with a spanning bridge. Project construction would commence during fall of 2001 and should be completed by winter of 2002.

As described in the following environmental assessment, prepared in accordance with the National Environmental Policy Act and other applicable laws and policies, the proposed action would affect natural resources, cultural resources, and visitor experience in the project area. Natural features that may be affected include soils, noise, visual resources, water quality, wetlands and jurisdictional waters, riparian woodland, coastal sage scrub, and special status species. Cultural features that may be affected include archeological sites, historic structures, and potentially significant cultural landscapes. Although proposed actions would result in short-term, adverse effects on some resources (e.g., water quality and wetlands), most aspects of the project would result in long-term beneficial effects. Measures to minimize or avoid adverse effects on resources have been incorporated into the proposed action. Such measures include conducting in-stream work during low-flow periods, diverting Solstice Creek flows around potential disturbance areas during construction, replanting disturbed creek banks with riparian vegetation, establishing an additional population of a State-listed rare plant (Santa Susana tarweed [*Deinandra minthornii*]), and monitoring construction areas to avoid and/or record archeological artifacts, among others.

CONTENTS

Purpose of and Need for the Action. . .1

Background. . .3

- Project Setting. . .3
- Relationship to Existing Plans. . .3
- Issues. . .4
- Impact Topics. . .4
 - Impact Topics Analyzed in this Document. . .4
 - Impact Topics Dismissed from Further Analysis. . .4

Alternatives Including the Proposed Action. . .6

- No Action. . .6
- Rehabilitate Facilities and Replace Low-water Crossing Alternative (Preferred Alternative). . .7
- Project Schedule. . .12
- Alternatives Considered but Eliminated from Detailed Analysis. . .12
 - Reconfiguring Parking Lot to North. . .12
 - Replacing Arizona Crossing with Culverts. . .12
- Environmentally Preferable Alternative. . .14

Affected Environment. . .15

- Natural Resources. . .15
 - Soils. . .15
 - Noise. . .15
 - Visual Resources. . .15
 - Water Quality. . .16
 - Wetlands and Jurisdictional Waters. . .16
 - Riparian Woodland. . .18
 - Coastal Sage Scrub. . .18
 - Special Status Species. . .19
- Cultural Resources. . .21
 - Archeological Resources. . .21
 - Historic Structures/Cultural Landscapes. . .22
 - Cultural Resources Mitigation. . .24
- Visitor Experience. . .25

Environmental Consequences. . .25

- Methodology. . .25
 - General Definitions. . .26
 - Special Status Species Analyses. . .26
 - Cultural Resource Analyses. . .27
- Impairment of Park Resources or Values. . .27
- No Action Alternative. . .28
 - Impacts on Natural Resources. . .28

| | |
|--|----|
| Impacts on Cultural Resources. . . | 33 |
| Impacts on Visitor Experience. . . | 34 |
| Rehabilitate Facilities Alternative (Preferred Alternative). . . | 35 |
| Impacts on Natural Resources. . . | 35 |
| Impacts on Cultural Resources. . . | 44 |
| Impacts on Visitor Experience. . . | 47 |

Public Involvement. . .48

Consultation and Coordination. . .48

| | |
|---|----|
| U.S. Army Corps of Engineers. . . | 48 |
| U.S. Fish and Wildlife Service. . . | 49 |
| National Marine Fisheries Service. . . | 49 |
| California Department of Fish and Game. . . | 49 |
| California Coastal Commission. . . | 50 |
| Los Angeles Regional Water Quality Control Board. . . | 50 |
| California State Historic Preservation Officer. . . | 50 |
| Chumash Representatives. . . | 51 |

Compliance Framework. . .51

References. . .52

List of Preparers. . .55

APPENDIX

A. A. U.S. Fish and Wildlife Service Letter on Threatened and Endangered Species

FIGURES

| | |
|---|----|
| 1. Project Vicinity. . . | 2 |
| 2. Overall Project Site Plan. . . | 8 |
| 3. Parking Area Layout and Grading (Preferred Alternative). . . | 9 |
| 4. Bridge Crossing Site Plan. . . | 13 |
| 5. Jurisdictional Waters Adjacent to Arizona Crossing. . . | 17 |

TABLE

| | |
|--|----|
| 1. Special status species and critical habitat of potential concern in the project area. . . | 19 |
| 2. Effects of the no-action alternative on special status species and critical habitat. . . | 33 |
| 3. Effects of the preferred alternative on special status species and critical habitat. . . | 42 |

PURPOSE OF AND NEED FOR THE ACTION

The National Park Service (NPS) is proposing to rehabilitate dilapidated facilities, expand educational opportunities, and remove a low-water (“Arizona”) crossing in Solstice Canyon at Santa Monica Mountains National Recreation Area (Recreation Area), Los Angeles County, California (Figure 1). The purposes of the project are to enhance public health and safety; increase educational opportunities; enhance visitor experience; upgrade utilities; restore stream ecosystem functions and riparian habitat; and remove a significant barrier to steelhead trout (*Oncorhynchus mykiss*) migration as a critical step in the eventual re-establishment of this species into Solstice Canyon.

The NPS acquired Solstice Canyon (project area) from the Santa Monica Mountains Conservancy in 1997 and determined that existing facilities at the site had deteriorated to an extent that threatened public health and safety. For example, the foundation of the existing visitor contact station has become unstable and is in the process of separating from the station. In addition, the corroded waterline that supplies drinking water throughout the project area lays mostly on top of the ground and has been patched extensively over 35 years with metal weld and wood plugs; the deteriorated pipeline is a constant maintenance problem and potential source for bacterial contamination of the water supply. Other examples include the deteriorated entrance road, which suffers from years of deferred maintenance, and an increasingly unstable Arizona crossing, which is being undercut by Solstice Creek. The Arizona crossing also presents hazards to pedestrians, many of whom have been injured after slipping while attempting to traverse the crossing’s slippery surface. In addition, limited parking presents additional hazards to pedestrians who are forced to park on road shoulders to hike into the project area.

Educational facilities also are limited at the Recreation Area, which is minimally able to provide educational programs for more than 40,000 children each year. As the population in southern California continues to grow, the need for educational facilities in the Recreation Area will grow accordingly. Finally, the Arizona crossing of Solstice Creek has altered natural processes and displaced native fish and vegetation. Removal of the Arizona crossing has been identified as an essential element in an interagency plan to restore a spawning population of steelhead trout in Solstice Creek (NPS, 2001).

This environmental assessment (EA) analyzes the impacts of two alternatives (a no-action alternative and an action alternative) on the environment in accordance with the National Environmental Policy Act of 1969, Council on Environmental Quality regulations (Title 40 **Code of Federal Regulations** Part 1500 *et sequentia*), the Clean Water Act of 1972, NPS policies, and other relevant laws and regulations. Additional alternatives were considered during early stages of the planning process but were subsequently eliminated from detailed consideration for reasons described later in this document; the environmental effects of eliminated alternatives are not evaluated in this EA.

See Figure Section for this page.

BACKGROUND

PROJECT SETTING

The project area is located in the south-central portion of the Recreation Area in southern California (Figure 1). According to its 1978 establishing legislation, a primary purpose of the Recreation Area was to “...preserve [the area’s] scenic, natural, and historic setting and its public health value as an air shed for the Southern California metropolitan area while providing for the recreational and educational need of the visiting public” (NPS, 2000a). The legislated boundary of the Recreation Area generally covers the Santa Monica Mountains region and stretches from the Hollywood Bowl 46 miles west to Point Mugu; the Pacific Ocean and Pacific Coast Highway border the southern edge of the park. The Recreation Area averages seven miles in width and its boundary encompasses 150,050 acres of which 69,099 acres are protected parkland. Although surrounded by urban communities, including Calabasas, Thousand Oaks, Westlake Village, and Agoura Hills, ninety percent of land within the Recreation Area is not developed.

The Recreation Area supports a variety of habitats but is dominated by chaparral and coastal sage scrub. Although limited in range, other habitats of particular ecological importance include salt marsh and riparian corridors dominated by sycamore and oak. Cultural resources at the Recreation Area include archeological remnants associated with Native American settlements and early Spanish/Mexican ranching communities.

Each year, more than 33 million visitors enjoy the Recreation Area’s beaches and mountains. Visitors hike, bike, or ride horses on hundreds of miles of mountain trails or drive scenic roads. Other common activities at the Recreation Area include surfing, swimming, and sunbathing on coastal beaches; birdwatching; picnicking; and participating in educational programs presented by the NPS, the California State Parks Department and the Santa Monica Mountains Conservancy, and other organizations.

RELATIONSHIP TO EXISTING PLANS

The Recreation Area currently is updating its 1982 general management plan (GMP). The draft GMP/Environmental Impact Statement was released for public review in January 2001. Although the NPS did not manage the project area when it prepared the 1982 GMP, that plan specified the park would provide a wide range of interpretive and educational programs to increase understanding and awareness of the mountain and coastal environments. The 1982 GMP also specified that “...altered ecosystems will be restored to more natural conditions wherever possible.” The draft 2001 GMP also emphasizes the Recreation Area’s role in providing recreational, educational and interpretive programs. In addition, under the preferred alternative, the draft GMP identifies the project area as a site that would support limited, high-intensity uses within which “the sights and sounds of people and development...would be readily apparent” and an area within which watershed processes would be protected and restored. The draft GMP also identifies restoration of steelhead trout to Solstice Creek as an objective. The preferred alternative evaluated in this EA supports the educational and restorative objectives of both the 1982 GMP and the draft 2001 GMP.

The Recreation Area has completed a Strategic Plan that presents a five-year outline of goals and objectives for the years 2000 to 2005, including restoring parklands, improving the local status of federally listed threatened and endangered species, improving visitor satisfaction, and improving visitor safety. The preferred alternative evaluated in this EA meets the goals and objectives described in the Strategic Plan, including elimination of threats to public health and safety posed by deteriorated facilities in the project area.

In addition, a plan to restore fish passage and riparian habitat along Solstice Creek has been prepared by the NPS and Resource Conservation District of the Santa Monica Mountains, in cooperation with the California Department of Transportation (Caltrans), the National Marine Fisheries Service, the California Department of Parks and Recreation, the California Department of Fish and Game, and other state and local organizations (NPS, 2001). The Solstice Creek restoration plan identifies impediments to the upstream migration of steelhead trout that prevent steelhead from spawning in the creek. Implementation of the plan would eliminate or modify migration barriers and restore habitat for steelhead. Replacing the existing low-water crossing in the project area with a bridge or bridge-like structure, as described in the preferred alternative evaluated in this EA, is identified in the plan as a key action necessary to restore steelhead trout to Solstice Creek.

ISSUES

The primary issues driving the actions considered in this EA include (1) threats to public health and safety, including road hazards and potential contamination of drinking water; (2) limited educational/interpretive opportunities in the project area; and (3) in-stream impediments to steelhead trout.

To address these issues, the preferred alternative has been designed to (1) replace and rehabilitate unstable structures; (2) upgrade the water-system and bury the new waterline to eliminate threat of bacterial contamination of drinking water supplies; (3) enhance educational potential at the site by providing an informal amphitheater and educational center in currently disturbed areas; (4) provide additional parking to accommodate visitors who currently park on the entrance road or other nearby roads to hike into the project area; and (5) remove one of several in-stream impediments to facilitate restoration of steelhead trout to Solstice Creek.

IMPACT TOPICS

Impact Topics Analyzed in this Document. Impacts of the preferred action and alternative on the following topics are presented in this EA: (1) soils, (2) noise, (3) visual resources, (4) water quality, (5) wetlands and jurisdictional waters, (6) riparian woodland, (7) coastal sage scrub, (8) special status species, (9) archeological resources, (10) historic structures, and (11) visitor experience.

Impact Topics Dismissed from Further Analysis. The non-controversial topics listed below either would not be affected or would be affected negligibly by the alternatives evaluated in this EA. Therefore, these topics have been dismissed from further consideration or analysis.

Negligible effects are effects that are localized and immeasurable or at the lowest levels of detection.

Prime and Unique Farmlands. None of the alternatives evaluated in this EA would affect prime or unique farmlands, as potentially affected areas are located on NPS property that does not support agriculture.

Air Quality. The Recreation Area was established in part to provide a “public health value as an air shed for the Southern California metropolitan area.” However, since the 1940s, air quality measurements taken in the Los Angeles metropolitan area have been among the worst in the United States (NPS, 2000a). Air quality in the vicinity of the Recreation Area is primarily degraded by vehicular and industrial emissions and is worst in summer when solar radiation increases and carbon monoxide, hydrocarbons, nitrogen oxides, and ozone are trapped closer to the ground. In general, coastal areas, including the project area, which are open to sea breezes exhibit better air quality than interior valleys or surrounding urban areas.

The Clean Air Act of 1963, as amended, and associated NPS policies require the NPS to protect air quality in parks. Although the preferred alternative would require use of heavy equipment during construction during certain activities, including road rehabilitation, bridge construction, and building demolition, emissions and dust associated with these activities would be short-term and negligible in a local and regional context.

Water Quantity. None of the actions evaluated in this EA would affect the quantity of water or runoff entering waterways or wetlands in the Recreation Area or project area. Although the parking lot in the project area would be reconfigured to include approximately 0.1 additional acre under the preferred alternative, a catchment basin with a chemically absorbent mat would be constructed to retain water and filter pollutants that may be present in runoff from the lot.

Floodplains. According to Federal Emergency Management Agency maps (FEMA, 1985), the project area is not subject to ocean-based flooding. In addition, based on peak discharge data (3,157 cubic feet per second), estimates of high-flow velocity (eight feet per second), and channel capacity of Solstice Creek (approximately 500 square feet), only actions to remove the Arizona crossing and restore Solstice Creek would be undertaken within the 100-year floodplain. Other actions proposed under the preferred alternative, including construction of vault toilets and an informal amphitheater, would be located above the 100-year floodplain in the project area.

Although some sections of road proposed to be resurfaced under the preferred alternative would be located within the 100-year floodplain, road resurfacing would not reduce the capacity or functions of the floodplain, including sedimentation processes, dissipation of flood-flow energy, and ground-water recharge. Therefore, the actions evaluated in this EA are excepted from further floodplain consideration in accordance with exception V(B)2 of the NPS's July 1, 1993, *Floodplain Management Guideline*, which covers “entrance, access, and internal roads to or within units of the NPS” that are located in day-use areas for the enjoyment of visitors.

Vegetation (General). The Recreation Area supports a variety of habitats including chaparral, coastal sage scrub, coast live oak woodland, valley oak savanna, salt marsh, riparian woodland,

and non-native grassland. Wetlands, including riparian woodland and freshwater marsh, are particularly important in the park, since an extraordinary number of wildlife species utilize these regionally rare habitats.

Despite the diversity of habitats in the Recreation Area, only coastal sage scrub and riparian woodland are present in the project area and only those habitats are evaluated in this EA. Other portions of the project area are dominated by development, including a parking lot and picnic area, and do not support native vegetation.

Wildlife (General). Many resident and migratory species of wildlife inhabit the Recreation Area, including 50 species of mammals, 384 species of birds, 25 species of reptiles, and up to 11 species of amphibians (NPS, 2000a). The variety of birds is particularly notable with diverse populations of raptors, shorebirds, and migratory songbirds. Other common wildlife in the Recreation Area include coyotes, mule deer, raccoons, jackrabbits, ground squirrels, western fence lizards, rattlesnakes, and Pacific tree frogs, as well as numerous species of insects and other invertebrates.

Although several species of wildlife, particularly those associated with coastal sage scrub and riparian woodlands, may reside in or near the project area, the actions evaluated in this EA would be undertaken in developed areas that support high visitation and vehicular traffic. Wildlife in the project area would be habituated to high levels of disturbance and human activity and would be affected negligibly, if at all, by the actions evaluated in this EA.

Socioeconomics and Environmental Justice. Local and regional businesses, residents, and tourists determine the socioeconomic climate in the vicinity of the park, which is located adjacent to one of the most densely populated areas of the United States. Although park visitation exceeds 33 million people per year (NPS, 2000a), the actions evaluated in this EA would not affect local or regional economics or adversely affect socially or economically disadvantaged populations.

ALTERNATIVES INCLUDING THE PROPOSED ACTION

NO ACTION

Under the "no-action" alternative, the Recreation Area would perpetuate existing maintenance of facilities in the project area (Figure 2). The existing house and garage located near Solstice Creek would continue to deteriorate and would pose an increasing threat to public health and safety. The existing waterline would continue to corrode, requiring continual maintenance and potential contamination of local drinking water supplies. Due to limited parking, visitors would continue to park on shoulders of the existing entrance and other roads to hike into the project area where they would be offered limited educational and interpretive opportunities. The NPS would continue to provide portable toilets at the site for visitor use. In addition, under the no-action alternative, the Arizona crossing would remain in its current location and continue to block the upstream migration of steelhead trout.

REHABILITATE FACILITIES AND REPLACE LOW-WATER CROSSING ALTERNATIVE (PREFERRED ALTERNATIVE)

The preferred alternative includes several actions that were evaluated in a Value Analysis Study completed for the project (NPS, 2000c). Primary elements evaluated during that study included demolition of two buildings; replacement of existing waterlines; construction of a covered gathering area, new restrooms, and informal amphitheater; expand and reconfigure the parking area to more safely accommodate visitors and education groups; rehabilitation of roads; and replacement of the entrance gate. In addition, the NPS considered two alternatives for replacing an existing Arizona crossing to facilitate upstream passage of steelhead trout and provide all-weather access to the project area.

Although variations on elements were examined during the Value Analysis Study, the variations that were considered typically were located within the same area and would result in similar effects on the environment. For instance, the study evaluated several parking lot configurations; however, most variations were located within an area of existing disturbance and entailed only minor shifts in the same direction from the existing parking lot's footprint. In another example, the study evaluated replacing the existing waterline with pipes of various diameters (e.g., four-inch or two-inch), although all new piping would be placed adjacent to existing roadways within disturbed shoulders opposite from Solstice Creek. Due to their similarity in footprint and location, variations on the effects of alternative actions have been considered negligible and have been evaluated in this EA as one alternative (i.e., the preferred alternative).

Prior to construction, the NPS would initiate pre-construction activities in the project area to control false caper (*Euphorbia terracina*) in accordance with integrated pest management policies outlined in NPS-77, *Natural Resources Management*. False caper is a highly invasive, non-native, noxious weed recently discovered in Solstice Canyon that establishes readily in disturbed areas from which it may spread to undisturbed sites. Following construction, the Recreation Area anticipates implementing additional measures to control false caper throughout Solstice Canyon.

Building Removal. Under the preferred alternative, the deteriorating house and garage that sometimes are used as a visitor contact station would be removed and would be replaced by an open-air shelter (Figures 2 and 3). The buildings would be removed carefully using heavy construction equipment in a manner that prevents construction debris from entering Solstice Creek.

Waterline Replacement. Under the preferred alternative, the existing aboveground, metal waterline in the project area would be removed and replaced with buried, polyvinyl chloride (PVC) and polyethylene (PE) pipe. The proposed action would entail placement of a four-inch diameter PVC pipe from the City of Malibu's waterline near the entrance gate to the existing parking lot. A two-inch diameter PVC pipe would extend from the parking lot to the Keller House (Figure 2). Installation of a two-inch line would permit installation of a residential fire

See Figure Section for this page.

See Figure Section for this page.

sprinkler system capable of pumping 26 GPM at the Keller House. The existing two-inch diameter pipe that services the TRW dormitory would remain in its current location. All waterlines would be installed in trenches in previously disturbed areas within the roadbed on the upslope from Solstice Creek. Existing above-ground pipes would be removed; in areas where the pipe crosses over Solstice Creek, piping would be cut on each side of the creek and sections would be removed to ensure that soil and debris do not enter the creek. Buried sections of the pipeline would be abandoned in place.

New Structure Construction. Under the preferred alternative, three new structures would be constructed in the project area. These new structures would include an open-air educational shelter, a restroom, and an informal amphitheater.

The educational shelter would provide a covered gathering place for visitors attending educational and interpretive programs at the Recreation Area (Figures 2 and 3). The structure would be located on the site currently occupied by the deteriorating house and garage. The new shelter would be constructed using an “open-air” design and would be approximately 30-feet long by 30-feet wide. Prior to construction, silt fencing would be erected and maintained between the construction site and the upland edge of Solstice Creek to prevent soil and other debris from entering the waterway.

The informal amphitheater would be constructed south of the existing parking lot in an existing picnic area (Figure 3). The amphitheater would cover less than 0.05 acre and would include several wood benches arranged in a semicircle facing Solstice Creek. Prior to construction, silt fencing would be erected and maintained between the construction site and the upland edge of Solstice Creek to prevent soil and other debris from entering the waterway.

The proposed restroom facility would be located west of the existing parking lot (Figure 3) and would replace existing portable toilets that the NPS maintains in the project area. The proposed action would include four, self-contained, vault toilets that would not generate wastewater. The footprint of the restroom would be approximately 24-feet long by 18-feet wide.

The preferred alternative also would include a drinking fountain and lavatory for washing hands that could generate up to 650 gallons of grey water per day during high use. Grey water likely would be directed into an existing septic tank and leachfield that services the visitor contact station but may require installation of a new septic tank and leachfield near the parking lot. Prior to construction, silt fencing would be erected and maintained between the construction site and the upland edge of Solstice Creek to prevent soil and other debris from entering the waterway.

Parking Lot Reconfiguration. Under the preferred alternative, the existing parking lot would be reconfigured to increase visitor access and safety. A visitor drop-off area able to safely accommodate buses would be constructed near the educational shelter and space for approximately 15 additional automobiles would be provided on approximately 0.1 acre adjacent to the site (Figure 3). In addition, an unpaved parking and drop-off area able to accommodate at least two horse trailers would be provided at the eastern end of the parking lot. The equestrian site would provide hitching posts and a water trough for horses; hitching posts also would be provided adjacent to the proposed restroom facility.

Following parking lot construction, native trees (e.g., California sycamore [*Platanus racemosa*]) would be planted in and adjacent to the parking area. In addition, seeds of Santa Susana tarweed (*Deinandra minthornii*), a State-listed rare plant, would be collected and propagated from a population several miles up the Solstice Creek drainage and would be used to establish an additional population of plants in the project area upslope from the parking lot or elsewhere in the Recreation Area. At least fifty seedlings would be planted north of the parking lot. After two years, Recreation Area staff would ensure that at least ten of those plants have survived. If less than twenty plants remain alive after two years, Recreation Area staff would collect and propagate seeds and outplant additional Santa Susana tarweed until at least ten, self-maintaining plants have been established in the area. Plants would be watered as necessary throughout the first growing season to ensure availability of adequate moisture.

Road Rehabilitation. Under the preferred alternative, approximately one mile of existing roadway from the entrance gate to the Keller House would be rehabilitated (Figure 2). Although the road's existing width of 14 feet would be retained from the entrance gate to the parking area, the remainder of the road from the parking lot to the Keller House would be narrowed to ten feet. Road rehabilitation would entail in-place retention of existing asphalt with minor repair of cracks and potholes in some areas. Following repair, the asphalt roadway would be covered by tan-colored chip-seal to blend with local soils.

Entrance Gate Replacement. Under the preferred alternative, the existing entrance gate would be widened to provide safer access for vehicles and trailers and its design improved in accordance with NPS standards to create a more inviting appearance (Figure 2). The design would feature a metal gate and posts of stone and/or heavy timber.

Staging Area. A staging area for construction equipment and a trailer would be located on a small portion of a disturbed site approximately one-quarter mile west of the visitor contact station/parking area immediately adjacent to the road (Figure 2).

Modifications at the Arizona Crossing. Under the preferred alternative, the existing Arizona crossing of Solstice Creek located in the southern portion of the project area would be removed and the creek would be restored (Figure 2). The Arizona crossing, consisting of pavement and fill material, would be excavated using heavy equipment. Pavement, metal, and other potential debris would be transported off-site for disposal at an approved landfill. Dirt and rocks would be disposed at a disturbed site near the Keller House that previously supported a trailer (Figure 2) or at an approved landfill site. Following removal of the road crossing, the Solstice Creek channel would be excavated upstream approximately 200 feet at a gradual slope that reflects natural geomorphic conditions in the project area (i.e., generally not more than four percent) (Figure 4). Restoration of the stream channel to a natural slope upstream of the Arizona crossing would permit fish passage and should eliminate upstream headcutting and erosion.

In addition to removing the existing Arizona crossing, the NPS would construct a bridge to permit upstream migration of steelhead trout. The bridge most likely would be a prefabricated span with a length of at least 50 feet and a width of 18 feet (Figure 5). Spanning Solstice Creek with a prefabricated bridge would require construction of abutments setback from both sides of

the creek to support the structure. The footing of abutments would be slightly wider than the width of the bridge, and, if necessary, pilings may be driven an estimated 20-feet deep to anchor on stable material. The bridge would be designed to accommodate a 100-year flood.

Prior to undertaking construction activities in Solstice Creek, stream flows would be temporarily diverted around the construction site (Figure 5). To accomplish this, a coffer dam would be constructed upstream of the construction site and water would be diverted into flexible piping that would circumvent the construction area. Stream flows then would be returned to the Solstice Creek channel below the construction area. Although other materials may be used, the coffer dam likely would be constructed of sandbags that could be easily removed from the creek channel following construction. Water quality (pH, temperature, dissolved oxygen, and turbidity) in the creek would be monitored each day during the first week of diversion and at least once a week for the remainder of the period that water is diverted around the site. Water quality measurements would be taken upstream of the diversion point and downstream of the point where water is returned to the stream channel. All work within Solstice Creek at and upstream from the Arizona crossing would be completed during summer or fall months when creek flows are low.

Following construction and shortly after rewatering the creek, both banks of the channel would be revegetated. Revegetation would include planting willow and mulefat cuttings and transplanting salvaged alder saplings to reflect densities and composition of riparian vegetation immediately downstream from the disturbed site. Cuttings would be collected from willows and mulefat in Solstice Canyon and would be at least one-half inch in diameter and long enough (at least one foot) to intercept subsurface water percolating from the creek while maintaining at least two inches of material above ground. Cuttings would be inserted and tamped into channel sediments in close proximity to the edge of the low-flow channel to facilitate rooting success. Alder saplings would be planted along the upper edges of the restored creek channel.

Project Schedule. Actions proposed under the preferred alternative could begin as early as fall 2001 and may be completed by early 2003. In-stream work, including removal of the Arizona crossing, would be undertaken during summer and/or fall months when flows in Solstice Creek are low.

ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

Reconfiguring Parking Lot to North. During the Value Analysis Study (NPS, 2000c), the NPS considered reconfiguring the parking lot northward. However, for topographical reasons, expanding the parking lot to the north would have required excavation of extensive amounts of soil over a large area and would have required construction of tall, heavy-duty retaining walls. Due to excessive costs and sustainability issues associated with excavation and disposal of extensive quantities of fill and unnecessary disturbance to native topography, the NPS eliminated this alternative from detailed consideration.

Replacing Arizona Crossing with Culverts. The NPS considered replacing the existing Arizona crossing with a series of large culverts. However, during informal consultation, interested resource agencies, including the National Marine Fisheries Service and California

See Figure Section for this page.

Department of Fish and Game, expressed a strong preference for a spanning bridge for reasons of maintenance and sustainability. Due to the high probability that debris would regularly block the culverts and that downstream sediments eventually could erode to create an impediment similar to the existing Arizona crossing, the NPS determined this alternative was not likely to meet project objectives.

ENVIRONMENTALLY PREFERABLE ALTERNATIVE

In accordance with Director's Order-12, *Conservation Planning, Environmental Impact Analysis, and Decision-making*, the NPS is required to identify the "environmentally preferred alternative" in all environmental documents, including EAs. The environmentally preferred alternative is determined by applying the criteria suggested in the National Environmental Policy Act (NEPA) of 1969, which is guided by the Council on Environmental Quality (CEQ). The CEQ provides direction that "[t]he environmentally preferable alternative is the alternative that will promote the national environmental policy as expressed in Section 101 of NEPA, which considers

- fulfilling the responsibilities of each generation as trustee of the environment for succeeding generations;
- assuring for all generations safe, healthful, productive, and esthetically and culturally pleasing surroundings;
- attaining the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
- preserving important historic, cultural and natural aspects of our national heritage and maintaining, wherever possible, an environment that supports diversity and variety of individual choice;
- achieving a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities; and
- enhancing the quality of renewable resources and approaching the maximum attainable recycling of depletable resources (40 CFR 1500-1508).

Generally, these criteria mean the environmentally preferable alternative is the alternative that causes the least damage to the biological and physical environment and that best protects, preserves, and enhances historic, cultural, and natural resources (Federal Register, 1981).

As considered in this EA, the preferred alternative to rehabilitate facilities and remove the Arizona crossing to restore a portion of Solstice Creek is the environmentally preferred alternative. After review of potential resource and visitor impacts, and developing mitigation for impacts to natural and cultural resources, the preferred alternative achieves the greatest balance between the necessity of rehabilitating facilities and restoring natural ecological processes in the project area with preserving resources and visitor experience in the park.

AFFECTED ENVIRONMENT

NATURAL RESOURCES

Soils. The main soil association throughout Solstice Canyon is the Chumash-Boades-Malibu Association, while the canyon bottom supports a Fluvaquents-Riverwash complex (Wasner, personal communication).

The Chumash-Boades-Malibu Association is derived from shale and sandstone rock sources. Although characteristics vary by soil type, typical soil profiles include upper horizons of brown loam (yellowish brown gravelly loam in the case of Chumash soil) underlain by fractured, bedded shale at depths of seven to 27 inches. Malibu soil supports an intermediate layer of reddish brown clay at typical depths ranging from 19 to 27 inches. Volcanic, rock outcrops form common inclusions in this association.

Fluquents in the project area consist of very deep, very poorly drained soils that formed in alluvium on low floodplains. The topmost horizon in fluvaquents-riverwash typically supports a litter of leaves and twigs underlain by grayish brown loam. The loam layer transitions into sandy loam underlain by extremely gravelly sand on top of gravelly coarse sand at a depth of 48 to 55 inches.

Noise. The project area is located in an isolated canyon located approximately 1,000 feet north of the Pacific Coast Highway and extends up Solstice Canyon for approximately one mile (Figure 1). The closest, inhabited house to the project area is located approximately 500 feet south of the entrance gate between the gate and the Pacific Coast Highway. Other inhabited structures, including houses along the upper edge of Solstice Canyon, are located nearly one mile from the project area.

The dominant source of noise in the project area is automobile traffic and visitor activity in the parking area near the visitor contact station. Although noise associated with automobiles and visitors is common in the parking lot, particularly on busy, summer weekends, the project area is generally free of noisy, human intrusions and is characterized by the natural sounds of wind and wildlife. Dense vegetation and mature trees further reduce automotive and visitor noise within the project area. According to noise estimates generated during preparation of the Recreation Area's draft general management plan (Table 11 in NPS, 2000a) and general rules concerning noise attenuation (Minnesota Pollution Control Agency, 1999), noise in the project area associated with traffic on the Pacific Coast Highway is equivalent to noise within a library (i.e., approximately 50 decibels).

Visual Resources. Several structures in the project area are visible from many locations. For instance, the visitor contact station is visible from the parking lot and from trails at higher elevations in the canyon. A silo-like building located on a small hillock above the canyon floor also is visible from the parking lot, as well as from several trails in the project area. The portable toilets are visible from the parking lot and from higher-elevation trails and are highly visible against natural features and vegetation in the project area. Other structures, such as the existing water line, are visible only from limited, nearby locations. Many private residences along the

canyon rim outside of the project area are visible from the parking lot. In addition, most features along the canyon bottom, including the parking lot and visitor contact station, are visible from canyon-rim residences.

Water Quality. Water quality in Solstice Canyon is generally good but varies seasonally. Solstice Creek is a perennial, spring-fed creek that flows in a canyon with minimal development. Seven structures currently exist in the canyon (two in the parking area, two at the TRW site, one at the Keller House, and two at Tropical Terrace), of which all are owned and maintained by the NPS. Due to the absence of residential and urban development in Solstice Canyon, the creek is relatively free of herbicides, fertilizers, and other pollutants common to other drainages in and adjacent to the park.

The largest factor affecting water quality in Solstice Creek are seasonal storms that rapidly and greatly increase the volume of flow in the creek. In the Santa Monica Mountains, debris flows are relatively common in some drainages and occur when storm runoff lifts and transports sufficient sediments to form a thick slurry of water, soil, and rock. Although debris flows do not appear common in Solstice Canyon, heavy flows associated with storms regularly and seasonally mobilize sediments and debris that greatly increase turbidity and reduce water quality in Solstice Creek.

Wetlands and Jurisdictional Waters. Jurisdictional waters of the United States (jurisdictional waters) as determined in accordance with U.S. Army Corps of Engineers (Corps) criteria (40 CFR 110 *et sequentia*; Corps, 1987) are present in the project area (Figure 5). Although a narrow band of jurisdictional wetlands border Solstice Creek in some areas, the entire creek would be considered “wetland” under NPS criteria (NPS Procedural Manual 77-1, *Wetland Protection [NPS 77-1]*; USFWS, 1979). NPS 77-1 implements Executive Order 11990, *Protection of Wetlands*. According to Corps criteria, jurisdictional wetlands must have wetland hydrology, wetland vegetation, and hydric soils. According to NPS criteria, wetlands must support wetland hydrology and either wetland vegetation or wetland soils. In addition to wetlands, linear waterways characterized by a distinct “bed and bank” are considered by the Corps to be jurisdictional waters. Including the open-water channel and associated wetlands, a jurisdictional area approximately 25-feet wide is present upstream and downstream of the Arizona crossing in the project area and would be subject to the Corps’ regulatory program under the Clean Water Act.

The low-flow channel of Solstice Creek is characterized by unvegetated, open water, although wetland plants border the creek’s edge in many areas. Typical wetland plants along the edge of the creek include cattail (*Typha* sp.), nut-sedge (*Cyperus* sp.), and horsetail (*Equisetum* sp.). The low-flow channel of Solstice Creek is approximately ten-feet wide and is bordered by a low terrace that supports a mix of woody and herbaceous vegetation. During an August 24, 2000, site visit, flow depth in the creek was approximately two inches and water flow was estimated to be five cubic feet per second or less. The slope of the creek’s centerline upstream of the Arizona crossing averages three percent but varies in some stretches from less than two percent to greater than five percent.

See Figure Section for this page.

Narrow bands of wetland vegetation, typically five to ten-feet wide line both sides of Solstice Creek near the Arizona crossing in the project area. Wetlands on a low terrace above and adjacent to the low-flow channel of Solstice Creek are dominated by shrubs and shrub-like plants, including mulefat (*Baccharis sarothroides*), willow (*Salix* sp.), and mugwort (*Artemisia douglasiana*), which are categorized as “facultative wetland species” (i.e., they are expected to inhabit wetlands 67 percent to 99 percent of the time [USFWS, 1988]). At higher elevations on the terrace, near the upland edge, larger woody species, including white alder (*Alnus rhombifolia*) and California sycamore, predominate. White alder and California sycamore also are categorized as facultative wetland species. Although alders near the Arizona crossing are relatively young (less than 15-feet tall), a few large sycamores are present on the terrace edge.

The wetland/upland edge indicating the ordinary high-water mark is delineated by an abrupt transition from wetland vegetation to an upland community dominated by fennel (*Foeniculum vulgare*), laurel sumac, and deerweed (*Lotus scoparius*).

Statement of Findings. In accordance with NPS 77-1, “Statement of Findings” are required for certain actions that affect wetlands. However, the actions evaluated in this EA are exempt from Statement of Finding requirements pursuant to section 4.2(A), *Exceptions for “Water Dependent” Actions and Other Actions with “Minimal Impacts”*, which cover actions “designed specifically for the purpose of restoring degraded natural wetland, stream, riparian, or other aquatic habitats or ecological processes” and repair of existing structures that affect less than 0.25 acre of wetland habitat.

Riparian Woodland. Riparian woodlands are uncommon in the Recreation Area (NPS, 2000a) but present in the project area along the banks of Solstice Creek. Riparian vegetation in the project area is dominated by woody species. Shrubs, including willows and mulefat, are common in close proximity to the creek’s low-flow channel, while trees, dominated by white alder and California sycamore, are common on terraces near and above the wetland/upland edge. Most shrubs in the area are five to ten-feet tall, while the height of trees may exceed 50 feet. Alders in the project area, particularly near the Arizona crossing, are typically young and less than twenty-feet tall. Herbaceous vegetation in the project area, including cattails, nut-sedge, and mugwort, is limited to creek banks upstream and downstream of the Arizona crossing. Riparian vegetation on the near-shore bank of the visitor contact station is sparse, since the area is covered by rock riprap; however, several large trees, including California bay laurel (*Umbellularia californica*), are present on the opposite bank of the stream and at higher elevations adjacent to the visitor contact station. Although riparian vegetation is densest near Solstice Creek and on adjacent terraces, some riparian trees, particularly California sycamore, also are common in upland areas adjacent to coast live oaks (*Quercus agrifolia*).

Coastal Sage Scrub. Coastal sage scrub covers much of the southern-facing slopes along the coastal edge of the park and is the dominant vegetative community in the project area (NPS, 2000a; Holland, 1986). Coastal sage scrub in the project area is dominated by drought-deciduous and evergreen shrubs that provide continuous to intermittent cover. Shrub cover is particularly sparse north of the parking lot where the Santa Monica Mountains Conservancy maintained a native plant garden and nursery (Figure 4). However, the garden was abandoned

and, in recent years, coastal sage scrub species have begun to recolonize the site. Areas with sparse shrub cover support an abundance of non-native, herbaceous plants.

Dominant species in the area north of the parking lot include California sagebrush, coast goldenbush, laurel sumac, coast buckwheat (*Eriogonum cinereum*), and California fuchsia (*Epilobium canum*). Shortpod mustard (*Hirschfeldia incana*), a non-native weed, is particularly abundant north of the parking lot in the area that had been cultivated as a native plant nursery by the Santa Monica Mountains Conservancy.

Special Status Species. According to the U.S. Fish and Wildlife Service, eight species protected under the federal Endangered Species Act, including proposed critical habitat for California red-legged frog, may occur in or near the project area (Table 1) (Appendix A). In addition, according to the California Department of Fish and Game's Natural Diversity Database (NDDDB), 19 species of concern to the federal and/or State governments have been documented within the Malibu Beach and/or Point Dume U.S. Geological Survey quadrangles (Table 1) (CDFG, 2000).

According to the NDDDB, no special status species have been documented within Solstice Canyon or tributaries to Solstice Creek. In addition, based on surveys of the project area and life history characteristics of species of concern, only one species (Santa Susana tarweed) definitively inhabits the project area, while four species exhibit moderate potential and five species exhibit low potential to occur in the area (Table 1). One species with federal status, the threatened California red-legged frog, exhibits low potential to occur in the project area. The remaining eight species of potential concern in the project area are not listed. Although critical habitat for red-legged frog has been proposed within some canyons in the Recreation Area, areas proposed as critical habitat do not include Solstice Canyon (USFWS, 2000).

Table 1. Special status species and critical habitat of potential concern in project area.

| Common Name (Scientific Name) | Status* | Documented in Point Dume and/or Malibu Beach quad? | Potential Presence in Project Area |
|--|---------|--|--|
| Animals: | | | |
| San Diego desert woodrat (<i>Neotoma lepida intermedia</i>) | CSC | Yes | Low – inhabits coastal areas with moderate to dense canopies similar to habitat in project area; however, no nests/middens observed during site survey |
| Least bell's vireo (<i>Vireo bellii pusillus</i>) | FT, SE | No | Low – has not been identified in project area or adjacent lands but inhabits riparian areas similar to habitat in project area |
| Bank swallow (<i>Riparia riparia</i>) | ST | Yes | None – requires vertical banks/cliffs for nesting; no such habitat in area |
| Southern steelhead (<i>Oncorhynchus mykiss</i>) | FT, CSC | Yes | None – impediments in Solstice Creek preclude steelhead from accessing site |
| Tidewater goby (<i>Eucyclogobius newberryi</i>) | FT, CSC | Yes | None – inhabits coastal lagoons and lower reaches of streams; no such habitat in area |

| | | | |
|---|--------------|-----|--|
| Southwestern pond turtle (<i>Clemmys marmorata pallida</i>) | CSC | Yes | Low – anecdotal evidence indicates this species may have inhabited Solstice Creek, although it has not been observed during recent surveys |
| Coast Horned Lizard (<i>Phrynosoma coronatum</i>) | CSC | Yes | Moderate – inhabits coastal sage scrub similar to habitat in project area |
| San Diego mountain kingsnake (<i>Lampropeltis zonata pulchra</i>) | CSC | Yes | Moderate – inhabits riparian and scrub similar to habitat in project area |
| Two-striped garter snake (<i>Thamnophis hammondi</i>) | CSC | Yes | Low – NPS has not observed species in Solstice Canyon, although suitable habitat is present along creek |
| California red-legged frog (<i>Rana aurora draytonii</i>) | FT | No | Low – surveys of project area and adjacent streams/canyons have not discovered species |
| California red-legged frog Critical Habitat | CH | Yes | None. Although other areas within the Recreation Area have been designated as critical habitat for red-legged frog, Solstice Canyon is not included within those areas (see “map unit 29” in USFWS, 2001). |
| Plants: | | | |
| Malibu baccharis (<i>Baccharis malibuensis</i>) | CSC | Yes | None – requires volcanic substrates not present in project area; also not discovered during survey of project area |
| Santa Susana tarweed (<i>Deinandra minthornii</i>) | FSC, Rare | Yes | Documented in project area. Three plants are present immediately north of the rock retaining wall that borders northern edge of parking lot |
| Lyon’s pentachaeta (<i>Pentachaeta lyonii</i>) | FE, SE | Yes | None – requires grasslands/chapparral not present in project area; also not discovered during survey of project area |
| Coulter’s saltbush (<i>Atriplex coulteri</i>) | CSC | Yes | None – requires coastal bluffs not present in project area; also not discovered during survey of project area |
| Blochman’s dudleya (<i>Dudleya blochmaniae</i> ssp. <i>blochmaniae</i>) | FSC, CSC | Yes | None – requires open, rocky slopes over serpentine soils not present in project area; also not discovered during survey of project area |
| Marcescent dudleya (<i>Dudleya cymosa</i> ssp. <i>marcescens</i>) | FT, Rare | Yes | None – requires rock surfaces and/or rocky volcanic cliffs not present in project area; also not discovered during survey of project area |
| Santa Monica Mountains | FT, CSC | Yes | None – requires rocky outcrops |

| | | | |
|--|----------|-----|--|
| dudleya (<i>Dudleya cymosa</i> ssp. <i>ovatifolia</i>) | | | and/or volcanic cliffs not present in project area; also not discovered during survey of project area |
| Braunton's milkvetch (<i>Astragalus brauntonii</i>) | FE, CSC | Yes | None – inhabits disturbed areas in chaparral (Hickman 1993) overlying granite or limestone not present in project area; also not discovered during survey of project area |
| Parry's spineflower (<i>Chorizanthe parryi</i> var. <i>parryi</i>) | FSC, CSC | Yes | Low – NPS has not observed species in Solstice Canyon and project area is below typical elevational range for species (Hickman 1993); however, suitable coastal scrub habitat exists in area |
| Plummer's mariposa lily (<i>Calochortus plummerae</i>) | FSC, CSC | Yes | Low – NPS has not observed species in Solstice Canyon, although suitable coastal scrub habitat exists in area |
| Sonoran maiden fern (<i>Thelypteris puberula</i> var. <i>sonorensis</i>) | CSC | Yes | Low – NPS has not observed species in Solstice Canyon and project area is below typical elevational range for species (Hickman 1993); however, suitable riparian habitat exists in area |

*FE = federally endangered

*SE = State endangered

*Rare = State rare

*FT = federally threatened

*ST = State threatened

*FSC = federal species of concern

*CSC = State species of concern

*CH = federally designated critical habitat

CULTURAL RESOURCES

Archeological Resources. More than 1,500 archeological sites have been identified in the Santa Monica Mountains, primarily associated with the indigenous Chumash people and their neighbors, the Gabrielino/Tongva. For approximately 8,000 years, the Chumash inhabited a large territory (approximately 200 by 70 miles) along the western Santa Monica Mountains and the Pacific Coast. The Gabrielino/Tongva traditionally occupied eastern portions of the range. At the time of Spanish conquest of California in the late 18th century, the Chumash had developed a complex society supported by hunting/gathering, maritime fishing, and extensive trade utilizing a monetary system that involved the exchange of beads. They lived primarily in large semi-permanent settlements in lowland areas along rivers and streams, and in sheltered coastal areas (NPS, 2000a). On a seasonal basis, they also occupied specialized activity areas located inland from the coast. These latter areas commonly consisted of hunting camps, quarries, and sites used for ritual and astronomical purposes. Solstice Canyon likely served as a trade/travel corridor linking the coast and upland interior.

A large Chumash village known as *Loxostoxni* (LAN 210) was once situated at the mouth of Solstice Canyon. Test excavations were conducted in 1986 of a portion of the site presently situated on the ocean side of the Pacific Coast Highway. Among the recovered artifacts buried under highway fill were shell beads that dated Chumash occupation of the site from the late prehistoric period through the historic period (after 1782). Spanish mission registers indicate that the village likely existed until 1804 or 1805. In the early years of auto travel along the coast, visitors collected Chumash artifacts from this site that are now curated at the Southwest Museum in Los Angeles (King, 2000).

Several smaller prehistoric archeological sites have been identified in upland areas along Solstice Canyon and neighboring canyons that are likely functionally related to *Loxostoxni*. Five occupation sites have been recorded along the banks of Solstice Creek within the park unit. These are eroded midden deposits visible in the vertical creek bank. Two of these sites (LAN 1569 and LAN 2-6:2) are located outside of the project area. Within the project area, three sites (LAN 1570, LAN 1571, and LAN 2-6:1) are located along the eastern side of the Solstice Creek between the Arizona crossing and the Dry Creek crossing. These site exposures appear to be at least several feet from the downslope edge of the Solstice Canyon road. The sites consist of dark midden soils visible in south-facing vertical exposures of the creek bank. Cross-section exposures are culturally altered brown loam soils (at least a meter thick) overlying at least another meter of lighter-colored alluvium, forming the present grade at the creek edge. In recent years, stream bank erosion has removed an unknown portion of these sites, leaving remnants of unknown horizontal extent beneath the creek bank and road.

Oral historical information provided by Lisa Roberts indicated that large stone artifacts were found during the construction of the Roberts' Solstice Canyon residence complex. These artifacts were saved by the family, but by the mid-1990s were scattered. Additionally, at least two isolated chipped stone tools have been found by volunteers in the vicinity of the former offices of the Santa Monica Mountains Conservancy. Intensive survey failed to find evidence of sites in these areas.

In addition to the sites identified in Solstice Canyon by previous archeological surveys, a moderate potential exists for discovery of further isolated artifacts, midden deposits, and/or other evidence of prehistoric occupation by native peoples. If archeological resources are identified during the course of the project, the NPS would undertake appropriate protection and avoidance measures. If impacts could not be avoided, the NPS would follow regulatory procedures for mitigation in consultation with the California State Historic Preservation Office (SHPO) and Chumash tribal representatives. The NPS has carried out site investigations to confirm the existence of documented sites within the project area. These known resources would be avoided during construction activities affecting the road base, creek bottom, and other proposed terrain alterations. To ensure against inadvertent impacts, timely monitoring and coded flagging would be used to protect archeological sites during construction, and after streambed improvements are complete, creek banks would continue be monitored for slope stability and erosion of archeological sites.

Historic Structures. The ca. 1865 Keller House is located on the east side of Solstice Canyon Creek approximately 0.5 mile north (upstream) of the current visitor contact area. The one-story

stone cottage is thought to be the oldest standing stone building in the Santa Monica Mountains. The building is believed to have been constructed by Mathew Keller, a prominent Los Angeles area wine merchant and entrepreneur. In 1857, Keller acquired ownership of a former patented Spanish land grant (*Rancho Topanga Malibu Sequit*) that encompassed the lower portion of Solstice Canyon. However, early 20th century topographic maps show the Keller house situated just to the north of the land grant boundary, an anomaly that raises the possibility of builder error (The house was constructed prior to the Rancho being surveyed), or that the house may actually have been constructed by a homesteader or someone other than Keller. Keller was known as a “gentleman rancher”; although he grazed cattle on his holdings, he did not rely on the rancho as a primary source of income. His descendents later used the stone house as a weekend retreat and hunting lodge. The house was rehabilitated by the Santa Monica Mountains Conservancy (SMMC) in 1988 - 1991. Presently used as a NPS employee residence, it is recommended as potentially eligible for listing in the National Register of Historic Places (Greenwood, 2000).

Fred Roberts (commercial property manager, cattle rancher, and owner of a chain of Los Angeles grocery stores) owned the lower Solstice Canyon property prior to the SMMC. Roberts began acquiring Solstice Canyon land parcels in the early 1930s, including the former Keller property, to consolidate an 1100-acre estate. Roberts introduced exotic plants and animals on his estate, and later permitted television and movie filming to take place there. The area near the visitor contact station was used a pasture for Texas longhorn cattle.

The existing entrance road leading up Solstice Canyon appears on the 1900 USGS map for the area, and may date from the 1860s when the Keller House is presumed to have been constructed. The narrow road is currently asphalt-paved, another of the improvements undertaken by the SMMC in 1988. Although the National Register-eligibility of the road has not been formally evaluated, the alignment would appear to be the primary character-defining feature meriting preservation consideration.

The SMMC also placed the Arizona crossing of Solstice Creek that is proposed for removal under the preferred alternative. The present concrete crossing partially obscures an older concrete “hard crossing” of the same type placed elsewhere along Solstice Creek by the Roberts family. At least five other examples of this earlier crossing type are found further up the canyon, but all have sustained severe deterioration and displacement by erosion. The older lower crossing (now partially covered by the SMMC replacement) provided a critical first vehicle ford of the creek, and continues to play an important role for vehicle access to the remainder of the canyon.

Two small one-story frame and stucco buildings adjacent to the parking area are currently used as a visitor contact station and garage. About 1945, the Roberts family reportedly moved the frame residence building from the ridge separating Solstice and Latigo Canyons to its present location. The building was believed to have been constructed during World War II as a coastal defense station. No soldiers were stationed in the building after it was moved to Solstice Canyon, but at various times it housed the Roberts family caretaker, family members, and other tenants. The building was later vandalized. The SMMC renovated it for office use upon their purchase of the property, and very little of the original building fabric remains. Building modifications undertaken over the years include: roof modifications to accommodate clerestory

windows; replacement of exterior siding with stucco; replacement of interior plaster walls with drywall; replacement of windows and flooring; and the addition of a kitchen, bedroom, bathroom, and fixtures (Lisa Roberts, personal communication;). The garage appears to have been constructed after World War II (probably by Fred Roberts), and has been used for storage in recent years. Assessments of the buildings by an NPS historical architect and an architectural historian indicate that the two buildings do not appear eligible for the National Register because of diminished integrity and lack of historic significance. The NPS is consulting with the California State Historic Preservation Office to reach a consensus determination of non-eligibility to the National Register of Historic Places.

An existing windmill is located near the visitor contact area that reportedly powered one of the original wells on the Roberts estate. It provided water for exotic animals kept nearby and for the residence. An adjacent concrete slab and a General Electric 3-phase motor are associated with the windmill. A small culvert bridge at the entrance to the parking lot spans a drainage that flows into Solstice Creek. The culvert bridge was enlarged in the 1980s, but some of its components (such as a cattle guard grill) remain from the Robert's occupation period. During the 1980s and 1990s, the SMMC also built stone masonry walls, steps and pillars, wooden fences, and trails.

Cultural Resources Mitigation. Coded flagging and archeological monitoring during construction would be used to protect recorded prehistoric midden sites along Solstice Creek from construction disturbance. Barriers will be erected to protect the archeological sites from traffic and parking. Waterline trenching would also be located along the edge of the roadway upslope from the creek to minimize the possibility of inadvertent impacts. Upon proposed removal of the frame residence and garage, archeological examination of the grade surfaces within the footprints of these buildings would determine if archeological resources are present that could be affected by new facility construction at the location. The NPS would also evaluate (and implement as appropriate) methods for stabilizing archeological resources located along the stream bank upstream of the Arizona crossing to protect these from erosion. Other options, such as emergency salvage, would be considered if the impacts of erosion could not be effectively abated by stream bank stabilization. Should expanded leachfields be necessary, the park will complete additional archeological compliance.

Should presently unidentified archeological resources be discovered during construction, work in that location would stop until the resources are properly recorded by an NPS archeologist and evaluated under the eligibility criteria of the National Register of Historic Places. If the resources are determined eligible, appropriate measures would be implemented either to avoid further resource impacts or to mitigate their loss or disturbance (e.g., by data recovery excavations or other means) in consultation with the California SHPO and Chumash tribal representatives. In compliance with the Native American Graves Protection and Repatriation Act of 1990, the National Park Service would also notify and consult concerned Chumash representatives for the proper treatment of human remains, funerary and sacred objects should these be discovered during the course of the project.

The NPS would map and photodocument the 1940s "hard crossing" at the first ford of Solstice Creek to document this apparently intact concrete vehicle crossing. If, during consultation, the

California SHPO disagrees with the NPS determination that the visitor contact building and garage are not eligible for the National Register of Historic Places, the NPS would further consult with the SHPO on ways to avoid adverse impacts. If avoidance could not be achieved, the NPS would enter into a Memorandum of Agreement (MOA) with the SHPO and/or, as necessary, the Advisory Council on Historic Preservation, stipulating measures that the NPS would carry out to mitigate adverse effects. Mitigation would be anticipated to include documentation of the structure to standards of the Historic American Buildings Survey (HABS).

The NPS will provide appropriate curation for materials generated or discovered as a result of the project (e.g. photos, documents, maps, plans, architectural fabric, archeological artifacts, etc.).

VISITOR EXPERIENCE

Although 33 million people visit the Recreation Area each year, only a small number of visitors use facilities in the project area. Primary activities in Solstice Canyon include hiking, jogging, picnicking, horseback riding, birdwatching, and wildlife viewing. Visitors may access more than twenty miles of trails from the parking lot in Solstice Canyon; however, due to limited parking at the site, visitors often park on the shoulders of the entrance road or other nearby roads to access trails and facilities in the project area. In addition to trails, a small picnic area with picnic tables is located between the parking lot and Solstice Creek east of the contact station. Information concerning resources and facilities throughout the Recreation Area is available on bulletin boards and in pamphlets provided near the visitor contact station southwest of the parking lot. Restroom facilities in the area are limited to two portable toilets without running water located east of the parking lot. Overnight camping is not permitted in the project area.

ENVIRONMENTAL CONSEQUENCES

The National Environmental Policy Act (NEPA) requires that environmental documents disclose the environmental impacts of the proposed federal action, reasonable alternatives to that action, and any adverse environmental effects that cannot be avoided should the proposed action be implemented. This section analyzes the environmental impacts of two project alternatives on natural resources, cultural resources, and visitor experience. These analyses provide the basis for comparing the effects of the alternatives. The NEPA requires consideration of context, intensity and duration of impacts, indirect impacts, cumulative impacts, and measures to mitigate for impacts. NPS policy also requires that “impairment” of resources be evaluated in all environmental documents.

METHODOLOGY

General Definitions. The following definitions were used to evaluate the context, intensity, duration, and cumulative nature of impacts associated with project alternatives:

Context is the setting within which an impact is analyzed, such as the affected region, society as a whole, the affected interests, and/or a locality. In this EA/IS, the intensity of impacts are evaluated within a local (i.e., project area) context, while the intensity of the contribution of

effects to cumulative impacts are evaluated in a regional (i.e., park-wide) context or, in the case of special status species, within the context of a species range.

Intensity is a measure of the severity of an impact. The intensity of an impact may be

negligible, when the impact is localized and not measurable or at the lowest level of detection;

minor, when the impact is localized and slight but detectable;

moderate, when the impact is readily apparent and appreciable; or

major, when the impact is severely adverse and highly noticeable.

Duration is a measure of the time period over which the effects of an impact persist. The duration of impacts evaluated in this EA/IS may be

short term, when impacts occur only during construction or last less than one year; or

long term, when impacts last one year or longer.

Cumulative impacts are impacts on the environment that result from the incremental (i.e., additive) impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of who undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Special Status Species Analyses. In accordance with language used to determine effects on threatened and endangered species under the federal Endangered Species Act (USFWS 1998), potential effects on special status species were categorized as follows:

no effect, when the proposed actions would not affect special status species or critical habitat;

not likely to adversely affect, when effects on special status species are discountable (i.e., extremely unlikely to occur and not able to be meaningfully measured, detected, or evaluated) or completely beneficial; or

likely to adversely affect, when any adverse effect to listed species may occur as a direct or indirect result of proposed actions and the effect is not discountable or completely beneficial.

Remaining considerations concerning special status species, including conclusions and evaluation of cumulative impacts, are presented in accordance with the general definitions described above under “General Definitions”. As described in impact sections, a determination of “likely to adversely affect” does not necessarily constitute a “major” or even a “moderate” adverse impact to a species.

Cultural Resources Analyses. The assessment of impacts on cultural resources and historic properties was made in accordance with regulations of the Advisory Council on Historic Preservation (36 CFR 800) implementing Section 106 of the National Historic Preservation Act. Following a determination of the areas of potential effect, cultural resources were identified within these areas that are either listed in or eligible for listing in the National Register of Historic Places.

An assessment was made of the nature and extent of effects on cultural resources anticipated from implementing proposed undertakings. Cultural resources can be affected by actions that alter in any way the attributes that qualify the resources for inclusion in the National Register. Adverse effects can result when the integrity of a resource's significant characteristics is diminished. Consideration was given both to the effects anticipated at the same time and place of the undertaking, and to those potentially occurring indirectly at a later time and distance.

To provide consistency with requirements of the NEPA, the effects on cultural resources are also described in terminology intended to convey the duration, intensity, and beneficial or adverse nature of potential impacts. Impacts could be of short term, long term, or permanent duration. (Analysis of the duration of impacts is required under the NEPA; however, duration is not required and is not usually considered in assessing effects in terms of the National Historic Preservation Act). The intensity of impacts is defined as follows:

negligible, when the impact is barely perceptible and not measurable. Significant character-defining attributes of historic properties (including the informational potential of archeological resources) are not appreciably diminished by the undertaking;

minor, when the impact is perceptible and measurable. The effects remain localized and confined to a single element contributing to the significance of a larger national register property/district, or archeological site(s) with low to moderate data potential;

moderate, when the impact is sufficient to alter character-defining features of historic properties, generally involving a single or small group of contributing elements; a property individually significant at the local or regional level; and/or an archeological site(s) with moderate to high data potential; or

major, when the impact results in a substantial and highly noticeable change in character-defining features of historic properties, generally involving a large group of contributing elements; a property of exceptional individual significance at the state or national level; and/or an archeological site(s) with high to exceptional data potential.

IMPAIRMENT OF PARK RESOURCES OR VALUES

In addition to determining the environmental consequences of the preferred and other alternatives, NPS *Management Policies* (NPS, 2000b) and Director's Order-12, *Conservation Planning, Environmental Impact Analysis, and Decision-making*, require analysis of potential effects to determine if actions would impair park resources.

The fundamental purpose of the National Park System, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. NPS managers must always seek ways to avoid or minimize to the greatest degree practicable adverse impacts on park resources and values. However, the laws do give the NPS management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the NPS management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement that the NPS must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgement of the responsible NPS manager, would harm the integrity of park resources or values, including opportunities that otherwise would be present for the enjoyment of those resources or values. An impact to any park resource or value may constitute an impairment. However, an impact would more likely constitute an impairment to the extent it affects a resource or value whose conservation is

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
- identified as a goal in the Recreation Area's General Management Plan or other relevant NPS planning documents.

Impairment may result from NPS activities in managing the park, visitor activities, or activities undertaken by concessionaires, contractors, and others operating in the park.

A determination of impairment is made for each impact topic within each "Conclusion" section of this EA under "Environmental Consequences".

NO ACTION ALTERNATIVE

Impacts on Natural Resources. The following sections describe the effects of the no-action alternative on natural resources of concern in the project area.

Impacts on Soils. The no-action alternative would not affect existing soil conditions in the project area, although natural processes, including wind and rain, would continue to erode and rearrange soils along the banks of Solstice Creek and roadway shoulders.

Cumulative Impacts. A variety of past, present, and reasonably foreseeable actions have affected and will continue to affect soils in many areas throughout the park. The park is composed of a mountain chain at the edge of the North American and Pacific plates. Although larger canyons in the park were formed by tectonic action, erosion within drainages and stream channels have displaced and replaced large quantities of soil. In addition to natural processes, construction of private residences, urban developments, roads and visitor facilities has caused extensive displacement and rearrangement of soils in the park. For instance, construction of Mulholland Highway and canyon roads required extensive excavation and grading of canyon soils, as did

construction of trails and access points throughout the park. Typical soil effects associated with urban and residential developments include increase erosion, increased compaction and water retention capability, decreased infiltration, and increased runoff following storm events.

The no-action alternative would not contribute to cumulative effects on soils in the park.

Conclusion. The no-action alternative would not affect or impair soils in the project area. However, the banks of Solstice Creek and roadway shoulders would continue to erode due to historic processes that have shaped the natural topography of the park.

Impacts on Noise. The no-action alternative would not affect existing noise levels in the project area. Traffic entering and exiting the parking lot, particularly on summer weekends, would remain the main source of noise. However, the project area would remain relatively quiet compared to other areas in the park located closer to canyon roads and the Pacific Coast Highway.

Cumulative Impacts. A variety of past, present, and reasonably foreseeable actions have affected and will continue to affect noise levels throughout the park. Construction of roadways and residential developments throughout the park has increased noise levels in localized areas in many regions of the park. Increasing traffic on park roads will elevate noise levels further. In addition to private residences and businesses in and adjacent to the park, construction of park facilities, such as picnic areas and campgrounds, also have elevated noise in localized areas throughout the park.

The no-action alternative would not contribute to cumulative effects on noise in the park.

Conclusion. The no-action alternative would not affect noise levels or impair auditory resources in the project area.

Impacts on Visual Resources. The no-action alternative would maintain existing structures that visually intrude upon the landscape in the project area. The visitor contact station and portable restrooms would remain prominently visible to visitors entering and exiting the area and the existing waterline would remain visually obvious from many locations along the canyon bottom.

Cumulative Impacts. A variety of past, present, and reasonably foreseeable actions have affected and will continue to affect visual resources in the park. Construction of residential housing along ridge tops provides perhaps the largest visual intrusion on natural vistas within the park. Other structures, particularly roadways and trails, also have degraded visual resources in many areas by altering natural topography and creating obvious cuts that mar hills and canyons throughout the park.

The no-action alternative would contribute a negligible, long-term, adverse component to cumulative effects on visual resources at the park by maintaining structures that interfere with natural vistas and lines of sight.

Conclusion. The no-action alternative would have a minor, long-term, adverse effect but would not impair visual resources in the project area. The no-action alternative would maintain solid structures at the visitor contact station, which block views of Solstice Creek from the parking area, and would maintain portable toilets, which are visually prominent against natural vegetation and features in the project area.

Impacts on Water Quality. The no-action alternative would not affect water quality in the project area. Water quality would continue to be affected seasonally by natural processes, including summer drought and winter precipitation. Winter storms would continue to increase sediment and debris transport within Solstice Creek, resulting in temporarily decreased water quality; low-flow/energy conditions throughout the rest of the year would continue to decrease sediment transport and increase water quality in the system.

Cumulative Impacts. A variety of past, present, and reasonably foreseeable actions have affected and will continue to affect water quality in the park. The park is located adjacent to one of the most densely populated urban regions in the United States and many private residences are located within the park's boundaries. This population influences water quality in drainages and coastal areas at the park by increasing stormwater runoff and associated contaminants such as oil and antifreeze, contributing fertilizers and pesticides to natural flows, and increasing soil erosion and sedimentation in streams. Non-human factors, including storms and erosion that combine to create debris flows, also affect water quality in the park.

The no-action alternative would not contribute to cumulative effects on water quality in the park.

Conclusion. The no-action alternative would not affect or impair water quality in the project area, which would continue to be determined by natural processes in the canyon.

Impacts on Wetlands and Jurisdictional Waters. The no-action alternative would not affect existing wetlands and jurisdictional waters in the project area. The Arizona crossing of Solstice Creek would be maintained, which would cause continued retention of sediments upstream of the crossing and maintenance of the eroded pool downstream of the crossing. Cattails would continue to line portions of the creek channel and bottom sediments would remain dominated by fine sediments, unlike reaches of the creek further upstream and downstream of the Arizona crossing, which are characterized by cobble bottoms and lined by woody vegetation such as willows.

Cumulative Impacts. A variety of past, present, and reasonably foreseeable actions have affected and will continue to affect wetlands and jurisdictional waters in the park. Several drainages in the park (e.g., Malibu Creek) have been dammed to create reservoirs that provide water supply and recreational opportunities. Reservoirs within and immediately adjacent to the park include Lake Sherwood, Las Virgenes Reservoir, and Malibu Lake. Construction of dams and filling of reservoirs have adversely affected wetlands in the park by converting natural stretches of creek and riparian habitat to open water lakes that are often surrounded by residential development. In addition to reservoirs, numerous bridges, roads (e.g., Pacific Coast Highway), and stream crossings have been constructed that impede natural stream flows and reduce the extent of coastal and riparian habitat throughout the park. In addition, residential and urban development

along the coast has altered substantial areas of coastal wetland habitat and creek drainages, including developments at the mouths of Trancas Canyon, Zuma Canyon, and Las Flores Canyon.

The no-action alternative would not contribute to cumulative effects on wetlands and jurisdictional waters in the park.

Conclusion. The no-action alternative would not affect or impair wetlands and jurisdictional waters in the project area. Marsh-like habitat, including vegetation and sediments, would continue to be maintained upstream and downstream of the Arizona crossing, which would preclude re-establishment of natural channel conditions.

Impacts on Riparian Woodland. The no-action alternative would not affect existing riparian woodland in the project area. The Arizona crossing of Solstice Creek would be maintained, which would cause continued retention of sediments upstream of the crossing and maintenance of small patches of herbaceous vegetation, including cattails and nut-sedge, near the area. Woody vegetation also would be maintained in its current locations.

Cumulative Impacts. A variety of past, present, and reasonably foreseeable actions have affected and will continue to affect riparian woodland in the park. As described above under “Impacts [of the No-Action Alternative] on Wetlands and Jurisdictional Waters”, dominant factors that have affected riparian woodland include residential and urban development, particularly along the coastal mouths of canyons, and construction of dams and reservoirs in upstream areas. Other activities, including road and trail construction, also have reduced the extent of riparian habitat in some areas of the park.

The no-action alternative would not contribute to cumulative effects on riparian woodland at the park.

Conclusion. The no-action alternative would not affect or impair riparian woodland in the project area. Herbaceous vegetation would continue to be maintained in patches upstream and downstream of the Arizona crossing, and woody vegetation would continue to dominate in areas beyond the influence of the crossing.

Impacts on Coastal Sage Scrub. The no-action alternative would maintain the extant distribution of coastal sage scrub in the project area. Existing coastal sage scrub in the project area, including areas adjacent to the parking lot that are being recolonized by coastal sage scrub species, would not be affected under the no-action alternative.

Cumulative Impacts. A variety of past, present, and reasonably foreseeable actions have affected and will continue to affect coastal sage scrub in the park. Coastal sage scrub has been affected most dramatically along the southern and northern edges of the Santa Monica Mountains, where this habitat type is most common. Along the southern edge of the park, thousands of acres of coastal sage scrub have been lost to urban development, particularly in and adjacent to the City of Malibu and at Point Dume, which is located near the intersection of Kanan-Dume Road and the Pacific Coast Highway. An even greater amount of coastal sage scrub habitat, encompassing

tens of thousands of acres, have been lost to urban development immediately north of the park, including areas within the Cities of Thousand Oaks, Westlake Village, and Agoura Hills. In addition to broad-scale loss of habitat to urban development, small patches and corridors of habitat have been lost in the park where areas have been developed to provide hiking trails, picnicking areas, and roads. Construction of reservoirs, such as Las Virgenes Reservoir, also has restricted the distribution of coastal sage scrub within the park.

The no-action alternative would not contribute to cumulative effects on coastal sage scrub in the project area.

Conclusion. The no-action alternative would not affect or impair coastal sage scrub in the project area.

Impacts on Special Status Species. The only species affected under the no-action alternative is steelhead trout, which would be indirectly and adversely affected by maintenance of the Arizona crossing in Solstice Creek that would continue to prevent potential establishment of a spawning population in the drainage (Table 2). Other species would not be affected under the no-action alternative, which would not affect the extent of existing habitats or the extent of developed areas.

Table 2. Effects of the no-action alternative on special status species and critical habitat of potential concern in the project area.

| Species | Status* | Potential Effect |
|-------------------------------|---------|---|
| Animals: | | |
| San Diego desert woodrat | CSC | No effect. Potential habitat (i.e., coastal sage scrub) would not be affected but would continue to recolonize disturbed area north of the parking lot. |
| Least bell's vireo | FT, SE | No effect. Potential habitat (i.e., riparian areas along Solstice Creek) would not be affected. |
| Southern steelhead | FT, CSC | No direct effect but possible future, indirect, adverse effect. Maintenance of the Arizona crossing would preclude re-establishment of spawning steelhead in Solstice Creek if other migratory impediments are removed. |
| Southwestern pond turtle | CSC | No effect. Potential habitat, including a pool downstream of the Arizona crossing, would not be affected. |
| Coast horned lizard | CSC | No effect. Potential habitat (i.e., coastal sage scrub) would not be affected but would continue to recolonize disturbed area north of the parking lot. |
| San Diego mountain king snake | CSC | No effect. Potential habitat (i.e., coastal sage scrub and riparian areas) would not be affected. Coastal sage scrub would continue to recolonize disturbed area north of the parking lot. |
| Two-striped garter snake | CSC | No effect. Potential habitat (i.e., riparian areas along Solstice Creek) would not be affected. |
| California red-legged frog | FT | No effect. Potential habitat (i.e., riparian areas including the Solstice Creek channel and banks) |

| | | |
|---|-----------|---|
| | | would not be affected. |
| California red-legged frog critical habitat | CH | No effect. No critical habitat is present in Solstice Canyon (USFWS, 2001) |
| Plants: | | |
| Santa Susana tarweed | FSC, Rare | No effect. Three plants immediately north of the parking lot would not be affected. |
| Parry's spine flower | FSC, CSC | No effect. Potential habitat (i.e., coastal sage scrub) would not be affected but would continue to recolonize disturbed area north of the parking lot. |
| Plummer's mariposa lily | FSC, CSC | No effect. Potential habitat (i.e., coastal sage scrub) would not be affected but would continue to recolonize disturbed area north of the parking lot. |
| Sonoran maiden fern | CSC | No effect. Potential habitat (i.e., riparian areas along Solstice Creek) would not be affected. |

*FT = federally threatened

*Rare = State rare

*FSC = federal species of concern

*CSC = State species of concern

*CH = federally designated critical habitat

Cumulative Impacts. A variety of past, present, and reasonably foreseeable actions have affected and will continue to affect special status species in the park. As described above under “Cumulative Impacts [of the No-Action Alternative] on Wetlands” and Cumulative Impacts [of the No-Action Alternative] on Coastal Sage Scrub”, thousands of acres of habitat in the park that potentially could support special status species have been lost to development. The primary cause of habitat loss in the park has been urban and residential development along the Pacific Coast Highway, most prominently in Malibu and at Point Dume. An even greater acreage of habitat has been lost north and east of the park to urban development within the cities of Thousand Oaks, Agoura Hills, Beverly Hills, and Santa Monica.

In addition to urban development, construction of dams and reservoirs within and adjacent to the park have altered potential habitat for special status species, including coastal sage scrub and riparian areas within creek drainages. Other developments within the park, such as trails and roads, also have fragmented and reduced the extent of habitat available for use by special status species.

The no-action alternative would not contribute to cumulative effects on special status species in the park.

Conclusion. The no-action alternative would not affect or impair special status species of potential concern in the project area, although maintenance of the Arizona crossing would eliminate future potential for steelhead trout to re-establish a spawning population in Solstice Creek.

Impacts on Cultural Resources. The following sections describe the effects of the no-action alternative on cultural resources of concern in the project area.

Impacts on Archeological Resources. Under the no-action alternative, there would be no construction-related ground disturbance with the potential to impact archeological resources.

Cumulative Impacts. Archeological resources in Solstice Canyon and elsewhere throughout the Santa Monica Mountains have been adversely impacted to varying degrees from past construction-related disturbances; visitor impacts and vandalism; erosion and other natural processes. If significant archeological resources could not be avoided, site data would be recovered in consultation with the SHPO and Chumash tribal representatives. The no-action alternative would not contribute to the impacts of other past, present and reasonably foreseeable future actions. Therefore, there would be no construction-related cumulative impacts to archeological resources resulting from the no-action alternative.

Section 106 Summary. After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementation of the no-action alternative would have *no effect* on identified archeological resources.

Conclusion. The no-action alternative would not impact or impair identified archeological resources, and would not contribute to past, present or reasonably foreseeable cumulative impacts on archeological resources in the area.

Impacts on Historic Structures/Cultural Landscapes. Under the no-action alternative, identified historic structures and landscapes would not be impacted.

Cumulative Impacts. Historic properties in Solstice Canyon have sustained previous loss or alteration as a consequence of modern improvements (e.g. renovation of the Keller House and road paving by the Santa Monica Mountains Conservancy).

The no-action alternative would not contribute to cumulative adverse impacts on historic structures and cultural landscapes. Historic structures and significant cultural landscape features would be preserved and maintained in accordance with NPS management policies and the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (1995). The historic Keller House would continue to be used for NPS housing, which would have moderate, long-term benefits for the building's preservation by ensuring it receives proper maintenance.

Section 106 Summary. After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementation of the no-action alternative would have *no effect* on identified historic structures and cultural landscapes.

Conclusion. The no-action alternative would not impact or impair identified historic structures and cultural landscapes, and would not contribute to past, present or reasonably foreseeable cumulative impacts on historic properties in the area.

Impacts on Visitor Experience. The no-action alternative would maintain existing visitor facilities and experiences in the project area. Educational and interpretive facilities would

continue to be limited and restroom facilities would continue to be restricted to portable toilets located east of the parking lot. On high-visitation days, visitors would continue to park outside and hike into the project area, creating hazardous conditions on nearby roads, particularly Corral Canyon Road. The quality of the existing visitor contact station would continue to deteriorate and eventually would create safety concerns when buildings become unstable.

Cumulative Impacts. A variety of past, present, and reasonably foreseeable actions have affected and will continue to affect visitor experiences at the park. Since its designation as a national recreation area, the park has improved the quality of recreational and educational facilities available to visitors. Visitor information centers, camping facilities, and picnic areas have been established at several locations throughout the park. In addition to NPS facilities, other organizations, including the California Department of Parks and Recreation, also have established and continue to maintain visitor and camping facilities within the park's boundaries. Equestrian and hiking trails have been constructed and maintained throughout the park and a variety of educational and interpretive programs are provided by the NPS, California Department of Parks and Recreation, and the Santa Monica Mountains Conservancy.

The no-action alternative would contribute a negligible, long-term, adverse component to cumulative effects on visitor experience in the park.

Conclusion. The no-action alternative would have a minor, long-term, adverse effect but would not impair visitor experience. Under this alternative, inadequate restroom and parking facilities would be maintained, which would perpetuate hazardous conditions created when visitors park outside and hike into the project area.

REHABILITATE FACILITIES AND REPLACE LOW-WATER CROSSING ALTERNATIVE (PREFERRED ALTERNATIVE)

Impacts on Natural Resources. The following sections describe the effects of the preferred alternative on natural resources of concern in the project area.

Impacts on Soils. Under the preferred alternative, approximately 0.1 acre of soils comprising an estimated 1,000 cubic yards of material would be excavated from upland areas north of the parking lot and would be redistributed over the redesigned parking area (Figure 3). In addition, approximately 200-linear feet of creek channel comprising an estimated 300 cubic yards of sediment would be excavated and regraded within Solstice Creek adjacent to the Arizona crossing to create a stable channel slope similar to existing channel morphology in nearby, upstream reaches of the creek. Clean soils would be redistributed on site as necessary or disposed of at a designated site in the Recreation Area near the Keller House (Figure 2) or at an approved landfill.

Cumulative Impacts. As described above under "Impacts [of the No-Action Alternative] on Soils", a variety of actions have affected and continue to cumulatively affect soils at the park. Soils have been added, moved, and removed at numerous locations throughout the park by human actions and natural processes. Soil effects, including reduced water-holding capacity and

increased surface runoff, are particularly acute in highly developed areas such as Malibu and urban areas along the north and east edges of the park.

The preferred alternative would contribute a minor, long-term, neutral component to cumulative effects on soils in the park.

Conclusion. The preferred alternative would have minor, short-term and long-term, neutral effects that would not impair soils in the project area. Although soils would be rearranged within the areas of parking-lot expansion and creek restoration, soils would not be exported from or imported into the project area. In addition, although impacts associated with reconstructing the parking lot and restoring Solstice Creek would be readily apparent, the amount of soil affected ([1,300 cubic yards) represents a small portion of soils in the project area.

Impacts on Noise. Implementation of the preferred alternative would require use of heavy equipment (e.g., backhoes) during reconstruction of the existing parking lot, removal of the Arizona crossing, construction of the bridge, restoration of Solstice Creek, and removal of the visitor contact station. Other construction activities, including renovation of the entrance gate and rehabilitation of the road surface, also may entail short-term use of heavy equipment.

Most activities requiring use of heavy equipment would be conducted more than 1,000 feet from the closest, occupied house, located near Corral Canyon Drive (Figure 1). The entrance gate is approximately 500 feet from that house, while the Arizona crossing is approximately 1,000 feet and the parking area nearly 2,000 feet away. Occupied buildings along the Pacific Coast Highway are located approximately 1,500 feet from the entrance gate. Other occupied houses along the rim of Solstice Canyon are located nearly one mile from potential construction and visitor use areas. At a distance of 1,000 feet, noise resulting from use of heavy equipment would approximate noise associated with normal conversation, while construction equipment operating at distances greater than 2,000 feet would be even quieter and would be masked by traffic along the Pacific Coast Highway (NPS 1999; Minnesota Pollution Control Agency 1999).

Cumulative Impacts. As described above under “Impacts [of the No-Action Alternative] on Noise”, a variety of actions have and continue to cumulatively affect noise levels throughout the park. Traffic on the Pacific Coast Highway and other roadways in the park is the most common source of noise in the park, although visitor activities in congested areas (such as beaches) also elevate noise levels in localized areas.

The preferred alternative would contribute a negligible, short-term, adverse component to cumulative effects on noise in the park.

Conclusion. The preferred alternative would have minor, short-term, adverse effects but would not impair auditory resources within or adjacent to the project area. Nearby residents, particularly residents on Corral Canyon Drive may hear noise resulting from construction activities in the project area, although such noise would be relatively quiet and equivalent to noise resulting from traffic on the Pacific Coast Highway. The preferred alternative would not result in long-term effects on noise in the project area or at nearby residences.

Impacts on Visual Resources. Under the preferred alternative, several existing structures in the project area would be removed and two new structures would be constructed. Removal of the portable toilets would eliminate structures that contrast sharply with the project area's relatively natural setting. The visually intrusive portable toilets would be replaced by rustically designed restrooms with wood and rock facades that would be located near large trees west of the parking lot and would blend into the area's natural setting. In addition, replacement of the existing visitor contact station (a garage and house) with an open-air, educational shelter would extend views of Solstice Creek and native habitats south of the parking lot. The educational shelter also would be finished in wood and stone to blend naturally into the canyon setting.

Cumulative Impacts. As described above under "Impacts [of the No-Action Alternative] on Visual Resources", a variety of factors have and continue to cumulatively affect visual resources in the park. Primary factors affecting visual resources include residential and urban development within and adjacent to the park and the network of roads and trails along canyon bottoms and walls.

The preferred alternative would contribute a negligible, long-term, beneficial component to cumulative effects on visual resources in the park.

Conclusion. The preferred alternative would have a moderate, long-term, beneficial effect that would not impair visual resources in the project area. Replacement of the visitor contact station with an open-air shelter would remove two of the four solid buildings that are present and visible in the lower part of the project area. In addition, replacing the portable toilets with a wood-and-stone restroom and burying the waterline would remove additional visual intrusions.

Impacts on Water Quality. Activities proposed in the project area that could affect water quality include removing the existing Arizona crossing and regrading approximately 200-linear feet of Solstice Creek to reflect natural gradients in the project area (Figure 4). No activities proposed under the preferred alternative would affect groundwater.

As described below under "Mitigation", water quality in the project area would be preserved by temporarily diverting stream flows around proposed restoration areas and maintaining a turbidity barrier around the riprap-repair site. Incorporation of these measures would minimize degradation of water quality during construction. However, following removal of the coffer dam and return of seasonal flows to Solstice Creek, water quality would be degraded temporarily downstream from the construction area as flows suspend fine sediments while bottom sediments obtain a state of natural equilibrium. Revegetation of stream banks would reduce erosion of additional channel sediments after plants become established (see "Mitigation" below under "Impacts [of the Preferred Alternative] on Wetlands and Jurisdictional Waters").

Cumulative Impacts. As described above under "Impacts [of the No-Action Alternative] on Water Quality", a variety of factors have and continue to cumulatively affect water quality in the park. These factors include increased stormwater runoff, increased discharge of contaminants such as oil and pesticides, and increased erosion.

The preferred alternative would contribute a negligible, short-term, adverse component to cumulative effects on water quality in the park.

Mitigation. As described above under “Alternatives including the Proposed Action/Rehabilitate Facilities and Restore Creek Alternative”, the following measures have been incorporated into the project to reduce water quality impacts:

(1) Prior to removing the Arizona crossing and regrading Solstice Creek, a coffer dam would be constructed upstream of the proposed construction area (Figure 4). The coffer dam likely would be constructed of sand bags that could be removed easily from the creek channel following construction. Stream flows would be temporarily diverted at the coffer dam into flexible piping that would circumvent the construction area. Stream flows would be returned to the Solstice Creek channel downstream of the construction site (Figure 4). During construction, water quality parameters (pH, temperature, dissolved oxygen, and turbidity) would be measured above the point of diversion and below the point of return to ensure construction activities did not affect the water quality in downstream reaches of the creek.

(2) To reduce turbidity and increase water quality, before stream flows are returned to the restored stretch of creek, unconsolidated cobbles that are similar to those found in other areas of Solstice Creek (i.e., three to ten inches in diameter) would be distributed throughout the channel bottom. Placement of cobbles on the channel bottom would minimize sediment suspension that otherwise would occur following restoration of creek flows.

In addition to measures described above, the NPS would incorporate any additional requirements in accordance with section 401 certification pursuant to the Clean Water Act that would be obtained from the Los Angeles Regional Water Quality Control Board.

Conclusion. The preferred alternative would have a minor, short-term, adverse effect but would not impair water quality in the project area. Water quality would be preserved during construction activities by temporarily diverting water around restoration sites and maintaining turbidity barriers adjacent to the riprap-repair area. After returning flows to Solstice Creek, degradation of water quality (specifically turbidity) would be minimized by natural-sized cobbles along the channel bottom that would protect sediments below and would not be transported by low summer and/or fall flows.

Impacts on Wetlands and Jurisdictional Waters. Under the preferred alternative, approximately 300 cubic yards of sediment would be excavated and regraded within the jurisdictional limits of Solstice Creek to restore natural channel topography (Figure 5). The affected waters would cover an area approximately 200-feet long and 25-feet wide (0.11 acre), which would include approximately 0.07 acres of wetlands. The remaining 0.04 acre that would be affected supports the open-water channel of Solstice Creek. A backhoe (bucket and blade) would be used to excavate and restore a natural gradient to Solstice Creek and construction in the creek would occur only after temporarily diverting water around the construction area. Using salvaged material collected on-site during construction, unconsolidated cobbles similar to those occurring upstream and downstream with typical diameters of three to ten inches would be placed in the recontoured stream channel. Following construction and rewatering of the creek, both banks of

the channel would be planted with willow and mulefat cuttings and salvaged alder saplings to reflect densities and composition of riparian vegetation downstream from the disturbed area.

Cumulative Impacts. As described above under “Impacts [of the No-Action Alternative] on Wetlands and Jurisdictional Waters”, a variety of factors have and continue to cumulatively affect such areas in the park. These factors include construction of dams and reservoirs, roads and trails, and urban development that has encroached upon canyon drainages and coastal wetlands.

The preferred alternative would contribute a minor, long-term, beneficial component to cumulative effects on wetlands in the park by restoring natural conditions that have been altered by human activities in the project area.

Mitigation. As described above in “Alternatives including the Proposed Action/Rehabilitate Facilities and Restore Creek Alternative” and in addition to measures described above under “Impacts [of the Preferred Alternative] on Water Quality/Mitigation”, the following measures have been incorporated into the project to reduce impacts to wetlands:

- (1) Before beginning construction in the project area, the NPS would initiate activities to control false caper. Although false caper is not a wetland plant, it establishes readily in disturbed areas and inhabits upland terraces adjacent to Solstice Creek. Pre-construction control of false caper would be conducted in accordance with integrated pest management policies outlined in NPS-77, *Natural Resources Management*.
- (2) Following construction and immediately after rewatering the creek, both banks of the channel would be revegetated. Revegetation would include planting willow and mulefat cuttings and transplanting salvaged alder saplings to reflect densities and composition of riparian vegetation immediately downstream from the disturbed site. Cuttings would be collected from willows and mulefat in Solstice Canyon and would be at least one-half inch in diameter and long enough (at least one foot) to intercept subsurface water percolating from the creek while maintaining at least two inches of material above ground. Cuttings would be inserted and tamped into channel sediments in close proximity to the edge of the low-flow channel to facilitate rooting success. Alder saplings would be planted along the upper edges of the restored creek channel.

In addition to the mitigation measures described above, the NPS would incorporate any additional requirements in accordance with a Clean-Water-Act section 404 permit that would be obtained from the U.S. Army Corps of Engineers, Los Angeles District Office, and section 401 water quality certification that would be obtained from the Los Angeles Regional Water Quality Control Board.

Conclusion. The preferred alternative would have a minor, short-term, adverse effect and moderate, long-term, beneficial effect that would not impair wetlands in the project area. Short-term effects would occur during construction activities, when creek sediments would be excavated and regraded to restore natural topography. Long-term effects would begin shortly after returning diverted flows back to the restored creek channel. Following a short period necessary for channel soils and cobbles to equilibrate, sedimentation would decrease and

vegetation would become established. Within several years, willow and mulefat cuttings should reach maturity and alder seedlings may reestablish along naturalized channel banks.

Impacts on Riparian Woodland. The preferred alternative would result in the temporary loss of a small area of riparian woodland (less than 0.07 acre) necessary to restore a natural gradient to Solstice Creek. Affected vegetation mostly would comprise shrubs and non-woody perennials growing near the creek's low-flow channel, such as cattails, nut-sedge, willow, and mulefat. However, a few young alders also may be removed while restoring the creek channel, including a cluster of approximately ten trees located immediately northwest of the Arizona crossing.

Cumulative Impacts. As described above under "Impacts [of the No-Action Alternative] on Riparian Woodland", a variety of factors have and continue to cumulatively affect riparian woodland in the park. Primary factors that have reduced the extent of riparian woodland in the area include residential and urban developments at canyon mouths and construction of dams and reservoirs in upstream areas.

The preferred alternative would contribute a negligible, long-term, neutral component to cumulative impacts on riparian woodland in the park.

Mitigation. To reduce impacts and compensate for the loss of less than 0.07 acre of riparian woodland, the NPS would implement the measures described above in "Alternatives including the Proposed Action/Rehabilitate Facilities and Restore Creek Alternative", "Impacts [of the Preferred Alternative] on Water Quality/Mitigation", and "Impacts [of the Preferred Alternative] on Wetlands and Jurisdictional Waters". Those measures include protecting existing vegetation, particularly large trees, to the greatest extent possible and planting willow, mulefat, and alder along the banks of the disturbed stretch of Solstice Creek to reflect vegetative densities and composition in adjacent areas.

Conclusion. The preferred alternative would have a minor, short-term, adverse effect but would not impair riparian woodland in the project area. The preferred alternative would not have long-term effects on riparian woodland in the area. The disturbed area (approximately 200-linear feet and 0.07 acre) represents a small portion of the several miles of riparian woodland that exists within the Solstice Creek drainage. Short-term effects would occur during construction to restore natural topography to Solstice Creek. Within one or two seasons following construction, stands of willow and mulefat would become established on the banks of Solstice Creek and alder seedlings would recruit naturally into the area.

Impacts on Coastal Sage Scrub. Reconfiguration of the existing parking lot to accommodate 15 additional cars would cause the loss of approximately 0.1 acre of disturbed coastal sage scrub north of the existing parking lot in an area that the Santa Monica Mountains Conservancy previously had been maintained as a native-plant garden.

Cumulative Impacts. As described above under "Impacts [of the No-Action Alternative] on Coastal Sage Scrub", a variety of factors have and continue to cumulatively affect coastal sage scrub in the park. Primary factors that have reduced the extent of coastal sage scrub include

residential and urban developments, as well as smaller scale actions undertaken to provide visitor facilities within the park.

The preferred alternative would contribute a negligible, long-term, neutral component to cumulative impacts on coastal sage scrub in the park.

Mitigation. No mitigation for the loss of approximately 0.1 acre of coastal sage scrub habitat is proposed.

Conclusion. The preferred alternative would have a minor, short-term, adverse effect but would not impair coastal sage scrub in the project area. The area of disturbed habitat (approximately 0.1 acre) represents a small portion of the hundreds of acres of coastal sage scrub in Solstice Canyon.

Impacts on Special Status Species. The preferred alternative is not likely to adversely affect threatened or endangered fish, wildlife, or plants of potential concern in the project area (Table 3). The probability of threatened red-legged frogs inhabiting the area is low based on informal surveys of the project area and protocol-level surveys of nearby drainages (Sauvajot, personal communication) (Table 1). In addition, the probability of threatened least bell's vireo inhabiting the project area is low, particularly in late summer and fall when activities would be conducted in riparian areas. The preferred alternative, specifically removal of the Arizona crossing and restoration of the Solstice Creek channel, would have beneficial effects on threatened steelhead trout by implementing a critically needed step toward eventual restoration of a spawning population in the drainage.

Except for Santa Susana tarweed, which has been documented north of the parking lot, other species of potential concern in the project area are not likely to be adversely affected by proposed activities. Those species are not listed and have low probability of inhabiting proposed construction areas, based on life history characteristics, range limitations, and/or surveys of the project area (Table 1).

Three Santa Susana tarweed plants have been documented north of the parking lot in an area that would be affected by parking-lot reconfiguration. The plants were once part of a native plant garden that was maintained in the area prior to NPS ownership of the site. To avoid mortal take of Santa Susana tarweed, prior to construction, park biologists would carefully excavate plants and replant them at a nearby location upland of the proposed construction area.

Table 3. Effects of the preferred alternative on special status species and critical habitat of potential concern in the project area.

| Species | Status* | Potential Effect |
|--------------------------|---------|---|
| Animals: | | |
| San Diego desert woodrat | CSC | Not likely to adversely affect. Potential presence in project area is low and less than 0.1 acre of potential habitat that is highly disturbed would be affected. |
| Least bell's vireo | FT, SE | Not likely to adversely affect. Species has not |

| | | |
|---|-----------|--|
| | | been observed in project area and proposed activities in riparian areas would affect only a few trees that could provide habitat. In addition, construction activities in riparian areas would be undertaken in late summer or fall, when creek flows are low and migratory vireos are not likely to inhabit riparian areas in southern California. Following restoration of Solstice Creek, willow and mulefat cuttings would be planted at three to five-foot intervals along both banks for approximately 200-linear feet of the creek. |
| Southern steelhead | FT, CSC | Not likely to adversely affect. No direct effects as species is precluded from project area by downstream impediments. However, removal of Arizona crossing and restoration of Solstice Creek channel would have future, beneficial effects by increasing site suitability for eventually supporting a spawning population. |
| Southwestern pond turtle | CSC | Not likely to adversely affect. Potential presence in project area is low and species has not been observed in Solstice Creek. If turtles are identified in the project area prior to or during construction, activities would be halted and the NPS would consult with the California Department of Fish and Game prior to reinitiating activities. |
| Coast horned lizard | CSC | Not likely to adversely affect. Potential presence in project area is low and less than 0.1 acre of potential habitat that is highly disturbed would be affected. |
| San Diego mountain king snake | CSC | Not likely to adversely affect. Potential presence in project area is low and less than 0.1 acre of potential habitat that is highly disturbed would be affected. |
| Two-striped garter snake | CSC | Not likely to adversely affect. Potential presence in project area is low and species has not been observed in Solstice Creek. If garter snakes are identified in the project area prior to or during construction, activities would be halted and the NPS would consult with the California Department of Fish and Game prior to reinitiating activities. |
| California red-legged frog | FT | Not likely to adversely affect. Potential presence in project area is low, as species has not been observed during surveys of Solstice Creek and nearby drainages. If red-legged frogs are identified prior to or during construction, activities would be halted in project area and U.S. Fish and Wildlife Service would be consulted prior to reinitiating activities in Solstice Creek. |
| California red-legged frog critical habitat | CH | No effect. No critical habitat is present in Solstice Canyon (USFWS, 2001) |
| Plants: | | |
| Santa Susana tarweed | FSC, Rare | Likely to adversely affect. Three plants would be removed during parking lot expansion. Seeds |

| | | |
|-------------------------|----------|---|
| | | would be collected and propagated from a population several miles up Solstice Canyon and would be used to establish an additional population upland of the construction site or elsewhere in the Recreation Area. At least fifty seedlings would be planted north of the parking lot. After two years, the Recreation Area would ensure that at least ten of those plants have survived. If less than ten plants remain alive after two years, the park would collect and propagate seeds and outplant additional Santa Susana tarweed until at least ten, self-maintaining plants have been established in the area. Plants would be watered as necessary throughout the first growing season to ensure availability of adequate moisture. |
| Parry's spine flower | FSC, CSC | Not likely to adversely affect. Potential presence in project area is low and only 0.1 acre of potential, disturbed habitat would be affected. |
| Plummer's mariposa lily | FSC, CSC | Not likely to adversely affect. Potential presence in project area is low and only 0.1 acre of potential, disturbed habitat would be affected. |
| Sonoran maiden fern | CSC | Not likely to adversely affect. Potential presence in project area is low and species has not been observed in Solstice Canyon. If maiden fern are identified in the project area prior to or during construction, activities would be halted and the California Department of Fish and Game would be consulted prior to reinitiating activities. |

*FT = federally threatened

*Rare = State rare

*FSC = federal species of concern

*CSC = State species of concern

*CH = federally designated critical habitat

Cumulative Impacts. As described above under “Impacts [of the No-Action Alternative] on Special Status Species”, a variety of factors have and continue to cumulatively affect such species in the park. The primary factor that has affected special status species in and adjacent to the park is loss of habitat to residential and urban development.

The preferred alternative would contribute a minor, long-term, beneficial component to cumulative impacts on special status species by removing specified human-made structures in Solstice Canyon and restoring natural topography to Solstice Creek in the project area.

Mitigation. To reduce or eliminate impacts to special status species, a park biologist would survey the project area prior to initiation of construction activities to ensure that species of concern, such as southwestern pond turtle, have not entered the area. In addition, new structures were designed and sited to ensure associated construction activities were undertaken in areas that were highly disturbed and had been previously cleared of native vegetation. For instance, the amphitheater would be constructed in a cleared area that currently supports several picnic tables and the parking lot would be expanded into an area that had been cleared to support a native plant nursery. Construction activities in Solstice Creek to remove the Arizona crossing and

restore natural creek topography would be undertaken during late summer or fall when creek flows are low and migratory birds are less likely to inhabit the project area.

As described above under “Alternatives including the Proposed Action/Rehabilitate Facilities and Restore Creek Alternative/Parking Lot Expansion” and in Table 3, seeds of Santa Susana tarweed would be collected and propagated from a population upstream in Solstice Canyon and would be used to establish an additional population of at least twenty plants upslope from the parking lot in the project area.

Conclusion. The preferred alternative would have a minor, short-term, adverse effect but would not impair Santa Susana tarweed in the project area. Adverse effects to tarweed would be eliminated over the long-term by establishing an additional population of plants north of the parking lot that supports at least ten plants (eight more than currently inhabit the project area). Also, although the preferred alternative would not directly affect steelhead trout, this species would benefit indirectly through the elimination of an impediment to their upstream migration in Solstice Creek. The preferred alternative would not affect or would have negligible effects on other species of potential concern in the project area as noted in Table 3.

Impacts on Cultural Resources. The following sections describe the effects of the preferred alternative on cultural resources of concern in the project area.

Impacts on Archeological Resources. Proposed construction activities primarily would occur in previously disturbed areas and therefore would be expected to have negligible to minor, long-term adverse impacts on archeological resources. All waterline replacement would occur along disturbed road bed and shoulders upslope from Solstice Creek from the City of Malibu’s waterline to the Keller House. Waterlines would be placed along the road bed or shoulders upslope furthest from the creek to minimize possible disturbance of known archeological sites (LAN 2-6:1 and LAN 1570 and LAN 1571) that may extend from the creek to (and possibly under) the roadway. During construction, coded flagging would be placed to mark sensitive site areas for avoidance, and archeological monitoring would accompany ground-disturbing construction activities to provide additional site protection. After construction, traffic barriers will be installed to prevent driving and parking on the archeological sites near the road shoulder. The NPS also would evaluate (and implement as appropriate) methods for stabilizing archeological resources located along the stream bank upstream of the Arizona crossing to protect these from erosion.

The NPS has completed archeological surveys and assessments of all areas scheduled for ground disturbance. Following removal of the buildings, additional archeological assessments would be carried out of grade surfaces within the building footprints to determine if archeological resources are present that could be affected by new facility construction. Should significant archeological resources be discovered during construction, project redesign or other methods would be implemented to avoid impacts. If sites could not be reasonably avoided, data recovery excavations would be carried out in accordance with a plan approved in consultation with the SHPO and Chumash tribal representatives. If expanded leachfields are necessary, the park will complete additional archeological compliance.

Cumulative Impacts. Archeological resources in Solstice Canyon and elsewhere throughout the Santa Monica Mountains have been adversely impacted to varying degrees from past construction-related disturbances; visitor impacts and vandalism; erosion and other natural processes. Foreseeable future projects involving ground-disturbance, such as improvements to Solstice Creek for steelhead trout habitat restoration, would also have the potential to adversely impact archeological resources. If significant archeological resources could not be avoided, site data would be recovered in consultation with the SHPO and Chumash tribal representatives.

Because of the proposed site avoidance and mitigation measures, the preferred alternative would not appreciably contribute to the impacts of other past, present and reasonably foreseeable future actions. Therefore, there would be negligible to minor, long-term adverse cumulative impacts to archeological resources resulting from the preferred alternative.

Section 106 Summary. After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR 800.5, *Assessment of Adverse Effects*), the National Park Service concludes that implementation of the preferred alternative would have *no adverse effect* on identified archeological resources.

Conclusion. Although ground-disturbing undertakings of the current project have the potential to disturb archeological resources, project areas have been archeologically surveyed and appropriate measures would be implemented to ensure that known sites are avoided or appropriately mitigated. Therefore, negligible to minor, long-term adverse impacts that would not impair archeological resources would be anticipated. Under Section 106 of the National Historic Preservation Act, implementation of the preferred alternative would have *no adverse effect* on identified archeological resources.

Impacts on Historic Structures/Cultural Landscapes. The NPS is currently consulting with the SHPO for a consensus determination that the visitor contact building and garage are ineligible for listing on the National Register of Historic Places. In that case, removal of the buildings would be expected to have no impact on historic properties. However, if the SHPO disagrees with the NPS determination and believes the buildings are eligible for listing on the National Register, removal of the buildings would constitute a moderate, long-term adverse impact. In that case the NPS would consult with the SHPO on ways to avoid adverse impacts. If it were determined through consultation that the adverse impacts could not be avoided, the NPS would enter into a Memorandum of Agreement (MOA) with the SHPO and/or, as necessary, the Advisory Council on Historic Preservation, stipulating measures that the NPS would carry out to adequately mitigate adverse impacts (36 CFR 800.6, *Resolution of adverse effects*). Among the possible mitigation measures would be photodocumentation of the building(s) to the standards of the Historic American Buildings Survey (HABS) prior to removal.

There would be no direct impacts to the Keller House, although waterline replacement would afford the house greater fire protection in the future. The preferred alternative does not propose installation of a fire suppression system in the house as part of the current project. Eventual completion of fire suppression measures would have a moderate, long-term beneficial impact on the Keller House.

New construction of a restroom, education building, and an informal amphitheater would be expected to have no or negligible, long-term adverse impacts on historic properties. The buildings would be of minimal massing and would be constructed of natural-appearing materials (wood and stone) to blend with the environment. They also would be compatible with the stone vernacular architecture of the Keller House, although that building is visually removed from the area of new construction. In the late 1980s, the Santa Monica Mountains Conservancy expanded the parking area and constructed rock retaining walls along the upper perimeter of the lot. These features are therefore not considered historically significant and current project proposals to further expand/modify the parking area would be expected to have no adverse impacts on historic features. The windmill and other cultural landscape features in the vicinity of the visitor contact area would be avoided by construction activities.

Approximately one mile of the road from the entrance to the Keller House would be rehabilitated. The current alignment would be retained, although the road width would be narrowed from about 14 feet to 10 feet between the parking area and the Keller House. The road would be resurfaced with a tan-colored chip seal. These measures would be expected to have minor, long-term beneficial impacts on the historic road. The road would continue to follow its historic alignment, and its appearance would more closely approximate what formerly existed prior to asphalt paving and other non-historic improvements. Replacement of the Arizona crossing of Solstice Creek below the visitor contact area would remove an earlier underlying concrete crossing. This feature would be mapped and photodocumented at the time of removal. Replacement of the existing entrance gate to Solstice Canyon would not impact historic features.

Cumulative Impacts. Historic properties in Solstice Canyon have sustained previous loss or alteration as a consequence of modern improvements (e.g. renovation of the Keller House and road paving by the Santa Monica Mountains Conservancy).

Construction of new buildings and structures would be expected to have negligible, long-term cumulative adverse impacts on historic properties. The buildings would be sensitively designed to ensure architectural compatibility with the natural setting of Solstice Canyon and the rustic appearance of historic buildings such as the Keller House. Rehabilitation of the canyon road would provide long-term, minor cumulative beneficial impacts by ensuring that use of the road is maintained along the historic alignment. Other historic roads throughout the region have sustained or face threats of lost integrity as a consequence of widening, obliteration by higher speed modern roads, altered patterns of circulation, etc.

If the visitor contact building and garage are determined eligible for the National Register, removal of these buildings would have a moderate, long-term cumulative adverse impact as a consequence of the loss or adverse modification of World War II-era buildings in the area.

The preferred alternative would have beneficial impacts on historic structures. Therefore, in conjunction with reasonably foreseeable future actions, construction-related beneficial cumulative impacts would be anticipated from implementation of the preferred alternative.

Section 106 Summary. After applying the Advisory Council on Historic Preservation's criteria of adverse effects (36 CFR 800.5, *Assessment of Adverse Effects*), the National Park Service

concludes that implementation of the preferred alternative would have *no adverse effect* on historic structures. A determination of *no adverse effect* would be contingent on SHPO concurrence.

Conclusion. Proposed removal of the visitor contact building and garage would result in no impact on historic properties provided the buildings are determined ineligible for the National Register of Historic Places. Moderate, long-term adverse impacts would be expected if these buildings are determined eligible for the National Register. In this instance, the NPS would consult with the SHPO, and/or the Advisory Council on Historic Preservation, on ways to avoid adverse impacts. If adverse effects could not be avoided, the NPS would enter into a Memorandum of Agreement with the SHPO and/or the Council stipulating measures that the NPS would carry out to mitigate adverse effects.

Other actions proposed by the preferred alternative (e.g., construction of new structures and modification of the existing parking area) would be expected to result in negligible, long-term adverse impacts but would not impair historic properties. Structures would be sensitively designed to blend with the natural environment and existing vernacular architectural elements. Additional undertakings, such as the replacement of the waterline and road rehabilitation, would have negligible to moderate, long-term beneficial impacts. Waterline replacement would provide the means to adequately deliver fire-suppression water to the Keller House, and road rehabilitation would help restore a more historic appearance. Because no major adverse impacts would occur to historic properties whose conservation is necessary to 1) fulfill specific purposes identified in the Recreation Area's establishing legislation; 2) key to the Recreation Area's cultural resource integrity or visitor enjoyment; or 3) identified as a goal in the Recreation Area's GMP or other relevant NPS planning document, there would be no impairment of park resources or values.

Impacts on Visitor Experience. Under the preferred alternative, the project area would be closed intermittently throughout a period lasting from six to nine months when construction is undertaken near the Arizona crossing and parking lot. During closures, visitor access to the site would be restricted by posted signs and locked gates.

Following construction, the safety, appearance, function, and accessibility of visitor facilities would be improved. Threats posed to public health and safety by unstable buildings and deteriorated roads would be eliminated and hazards to pedestrians associated with inadequate parking and slippery conditions at the Arizona crossing would be reduced. Educational opportunities, including interpretive displays and programs, would be enhanced by construction of an open-air shelter and informal amphitheater in previously disturbed areas. Parking would be expanded to accommodate approximately 15 additional vehicles, which would reduce the frequency of visitors parking on roadside shoulders to access trails and facilities in the project area. In addition, an unpaved parking and drop-off area able to accommodate at least two equestrian trailers would be designated in the area, which would reduce parking conflicts between equestrians and other visitors to the project area (Figure 3).

Cumulative Impacts. As described above under "Impacts [of the No-Action Alternative] on Visitor Experience", a variety of factors have affected and continue to cumulatively affect

visitors in the park. Primary factors affecting visitor experience include the construction of recreational and educational facilities, campgrounds, trails, and visitor information centers. In addition, presentation of numerous interpretive programs by the NPS, California Department of Parks and Recreation, and the Santa Monica Mountains Conservancy also enhance visitor experiences at the park.

The preferred alternative would contribute a moderate, long-term, beneficial component to cumulative impacts on visitor experience by reducing hazards and providing additional facilities to accommodate the 40,000-plus children who attend interpretive and educational programs in the Recreation Area each year.

Mitigation. To mitigate for temporary inconvenience to visitors, portable restrooms would be maintained in the project area until newly constructed facilities become operational. In addition, existing information provided to visitors in the project area would be maintained until new facilities were completed. During periods of restricted access, signs would be posted informing the public of closures and locked gates would be maintained at the entrance to Solstice Canyon.

Conclusion. The preferred alternative would have minor, short-term, adverse effects and moderate, long-term, beneficial effects that would not impair visitor experience. Proposed actions would enhance visitor safety, expand educational opportunities, provide additional accommodations to equestrian users, and upgrade existing roads and restroom facilities.

PUBLIC INVOLVEMENT

The actions evaluated in this EA are referenced in the Recreation Area's draft general management plan (GMP) that has been distributed for public review (NPS, 2000a). During preparation of the draft GMP, the NPS distributed several newsletters to inform the public of planning activities and request comments on issues of concern. In addition to newsletters, a series of public meetings on the GMP were held in September 1997 and July 1998 to solicit additional comments. During preparation of the draft GMP, no comments were submitted concerning activities in Solstice Canyon, including oral comments received on the document in February 2001.

The NPS also will hold a public meeting to address the specific actions proposed under the preferred alternative evaluated in this EA. The purpose of the meeting will be for the NPS to receive comments and concerns from the public and answer project-specific questions. The meeting will be held locally during the time that the EA is available for a 45-day public review and comment period.

CONSULTATION AND COORDINATION

The following agencies were contacted and/or consulted during preparation of this EA:

U.S. Army Corps of Engineers, Los Angeles District (Corps). The NPS contacted the Corps to discuss regulatory and permitting issues. Priya Finnemore, Corps project manager, attended a site visit on August 24, 2000, and provided an August 30, 2000, letter to the NPS that listed

information necessary for the Corps to complete a section 404 permit for the project. Information requested in that letter has been incorporated into this EA.

During the site visit and subsequent conversations with the Corps, the NPS indicated interest in having proposed activities authorized under the Corps nationwide permit (NWP) program using NWP 27, *Stream and Wetland Restoration Activities*, although NWP 33, *Temporary Construction, Access, and Dewatering*, and/or other NWPs also may be applicable. The NPS has submitted a copy of this EA to the Corps with a request that the preferred alternative be authorized under the Corps' NWP program.

U.S. Fish and Wildlife Service, Ventura Field Office (USFWS). The NPS initiated informal consultation on threatened and endangered species by letter dated August 1, 2000 and invited the USFWS to attend a site visit. On August 24, 2000, Rick Farris, fish and wildlife biologist, attended a site visit with NPS and Corps staff, during which time endangered species issues were discussed. Subsequent to the site visit, the NPS received an August 30, 2000, letter that presented a list of eight species of potential concern in the project (Appendix A). The current accuracy of the list was verified by the NPS on February 5, 2001.

Based on the results of informal consultation and site investigations, the NPS has determined the preferred alternative is not likely to adversely affect federally threatened or endangered species and has sent a copy of this EA to the USFWS with a request for written concurrence with that determination.

National Marine Fisheries Service, Southwest Region (NMFS). The NPS initiated informal consultation with the NMFS (Anthony Spina) on August 8, 2000, to discuss issues related to steelhead trout in Solstice Creek. Mr. Spina explained that, although steelhead do not currently inhabit Solstice Creek, his office has supported restoration of conditions suitable for establishment of steelhead in the creek and has worked with local agencies to generate plans to accomplish that goal. In a subsequent message left on December 13, 2000, in response to a request by the NPS, the NMFS indicated a strong preference for replacing the Arizona crossing with a bridge span instead of culverts.

Based on the results of informal consultation, the NPS has determined the preferred alternative is not likely to adversely affect steelhead trout, although the project would have a future, beneficial effect by removing an obstacle to upstream migration. Accordingly, the NPS has submitted a copy of this EA to the NMFS with a request for concurrence that the preferred alternative is not likely to adversely affect steelhead trout.

California Department of Fish and Game (CDFG). The NPS contacted the CDFG (Natasha Lohmus, Mary Meyer, and Morgan Wehtje) on several occasions in fall 2000 and winter 2001 to discuss the project and compliance with state-administered laws, including CDFG's Streambed Alteration Program and the California Environmental Quality Act. Ms. Lohmus and Ms. Meyer described measures to reduce project impacts and Ms. Lohmus indicated a strong preference for replacing the Arizona crossing with a bridge span instead of culverts.

The NPS obtained a list of special status species that have been documented in the project area from the CDFG's Natural Diversity Database (CDFG, 2000). Based on information in that list, the NPS has determined the preferred alternative is likely to adversely affect Santa Susana tarweed, a State-listed rare plant, and has proposed to establish an additional population of tarweed at a suitable site in the Recreation Area. Ms. Meyer indicated that, as a federal agency, the NPS was not required to obtain a permit to take Santa Susana tarweed.

The NPS has modified the preferred alternative to incorporate actions recommended by the CDFG, including temporarily dewatering Solstice Creek during construction in the creek channel, revegetating creek banks with riparian plantings, and propagating and outplanting Santa Susana tarweed north of the parking lot. In addition, the NPS has submitted a copy of this EA to the CDFG for review.

California Coastal Commission (CCC). The NPS contacted the CCC (James Raives) by telephone on February 2, 2001, to discuss administration and procedures related to the Coastal Zone Management (CZM) Act and CZM determinations. Mr. Raives described three methods available to federal agencies for addressing CZM concerns related to proposed projects. Those methods included (1) submittal of a consistency determination, (2) submittal of a negative determination, and (3) submittal of information clarifying the project is environmentally beneficial in accordance with newly adopted regulations.

Based on coordination with the CCC and information obtained from the CCC's Internet site at "www.coastal.ca.gov/web/fedcd/fedcndx.html", the NPS has determined the actions proposed under the preferred alternative are consistent with California's CZM Program and qualify for a negative determination. Accordingly, the NPS has sent a copy of this EA to the CCC with a request for written concurrence with that determination.

Los Angeles Regional Water Quality Control Board (RWQCB). The NPS contacted the RWQCB (Tony Klecha) by telephone on January 31, 2001, to discuss water quality issues and the section 401 certification process. Mr. Klecha described typical measures that should be incorporated into projects proposed for 401 certification. The NPS has adopted those suggestions and incorporated them into the preferred alternative, including temporary dewatering of Solstice Creek during instream activities, monitoring water quality upstream and downstream of the diversion site, revegetating creek banks with riparian plantings, and lining the creek channel with unconsolidated cobbles to reduce sediment suspension and erosion. In addition, the NPS has submitted a copy of this EA to the RWQCB for review with an application for section 401 certification for activities proposed under the preferred alternative.

California State Office of Historic Preservation (SHPO). The NPS has begun consultation with the California SHPO regarding determinations of National Register of Historic Places eligibility, and the effect of this undertaking on cultural resources; and will provide the SHPO a copy of this EA. In accordance with 36 CFR 800, and the 1995 programmatic agreement among the National Park Service, the National Conference of State Historic Preservation Officers, and the Advisory Council on Historic Preservation, the NPS will consider and address comments of the SHPO pertaining to potential project impacts on historic properties.

Chumash/Native American Representatives. The NPS has initiated consultation with Chumash representatives regarding the current project and will provide them a copy of this EA. In accordance with 36 CFR 800, and the 1995 programmatic agreement among the National Park Service, the National Conference of State Historic Preservation Officers, and the Advisory Council on Historic Preservation, the NPS will consider and address Chumash and other Native American comments pertaining to potential project impacts on cultural and natural resources, and/or other project-related issues.

COMPLIANCE FRAMEWORK

The following laws and associated regulations provided direction for the design of project alternatives, the analysis of impacts and the formulation of mitigation/avoidance measures:

National Environmental Policy Act of 1969 (NEPA) (Title 42 U.S. Code Sections 4321 to 4370 [42 USC 4321-4370]). The purposes of the NEPA include encouraging "harmony between [humans] and their environment and promote efforts which will prevent or eliminate damage to the environment. . .and stimulate the health and welfare of [humanity]". The purposes of NEPA are accomplished by evaluating the effects of federal actions. The results of these evaluations are presented to the public, federal agencies, and public officials in document format (e.g., environmental assessments and environmental impact statements) for consideration prior to taking official action or making official decisions. Implementing regulations for the NEPA are contained in Part 1500 to 1515 of Title 40 of the U.S. Code of Federal Regulations (40 CFR 1500-1515).

Clean Water Act of 1972, as amended (CWA) (33 USC 1251-1387). The purposes of the CWA are to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters". To enact this goal, the U.S. Army Corps of Engineers (Corps) has been charged with evaluating federal actions that result in potential degradation of waters of the U.S. and issuing permits for actions consistent with the CWA. The U.S. Environmental Protection Agency also has responsibility for oversight and review of permits and actions that affect waters of the U.S. Implementing regulations describing the Corps' CWA program are contained in 33 CFR 320-330.

Coastal Zone Management Act of 1972 (CZMA) (16 USC 1451-1464). The CZMA presents a congressional declaration to "preserve, protect, develop, and where possible, to restore or enhance, the resources of the Nation's coastal zone for this and succeeding generations". The CZMA also encourages "states to exercise effectively their responsibilities in the coastal zone through the development and implementation of management programs to achieve wise use of the land and water resources of the coastal zone". In accordance with the CZMA, the State of California has adopted state laws and regulations, including a Coastal Zone Management Plan, which is administered by the California Coastal Commission (CCC). All actions proposed by federal, state, and local agencies in California must be consistent or compatible with the Coastal Zone Management Plan, as determined by the CCC.

Endangered Species Act of 1973, as amended (ESA) (16 USC 1531-1544). The purposes of the ESA include providing "a means whereby the ecosystems upon which endangered species

and threatened species depend may be conserved". According to the ESA, "all Federal departments and agencies shall seek to conserve endangered species and threatened species" and "[e]ach Federal agency shall. . .insure that any action authorized, funded, or carried out by such agency. . .is not likely to jeopardize the continued existence of any endangered species or threatened species". The U.S. Fish and Wildlife Service (non-marine species and marine turtles upon land) and the National Marine Fisheries Service (marine species, including anadromous fish and marine mammals) administer the ESA. The effects of any agency action that may affect endangered, threatened, or proposed species must be evaluated in consultation with either the USFWS or NMFS, as appropriate. Implementing regulations that describe procedures for interagency cooperation to determine the effects of actions on endangered, threatened, or proposed species are contained in 50 CFR 402.

National Historic Preservation Act of 1966, as amended (NHPA) (16 USC 470 *et sequentia*).

Congressional policy set forth in the NHPA includes preserving "the historical and cultural foundations of the Nation" and preserving irreplaceable examples important to our national heritage to maintain "cultural, educational, aesthetic, inspirational, economic, and energy benefits". The NHPA also established the National Register of Historic Places composed of "districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, engineering, and culture". Section 106 of the NHPA requires that federal agencies take into account the effects of their actions on properties eligible for or included in the National Register of Historic Places, and permit the Advisory Council on Historic Preservation an opportunity to review such actions. Federal agencies consult as appropriate with state historic preservation officers, tribal historic preservation officers or representatives, and other interested parties in fulfilling Section 106 requirements. Section 106 further requires federal agencies to propose and evaluate alternatives to undertakings that would adversely affect historic properties, or to adequately mitigate adverse effects if avoidance cannot be reasonably achieved. Section 110 of the NHPA requires federal agencies, in consultation with the state historic preservation officer, to locate, inventory, and nominate all properties that appear to qualify for the National Register of Historic Places. It also requires federal agencies to manage and maintain historic properties under their jurisdiction in a manner that considers the preservation of historic, archeological, architectural, and cultural values.

REFERENCES

California Department of Fish and Game. June 2000. Natural Diversity Database. Natural Heritage Division. Sacramento, CA.

Farris, R. Fall 2000 and winter 2001. Personal communications by telephone and during site visit with Chris Davis, NPS, Denver, CO. Fish and Wildlife Biologist, U.S. Fish and Wildlife Service. Ventura, CA.

Federal Emergency Management Agency. 1985. Flood Insurance Rate Map for Los Angeles County, California (Unincorporated Areas), Panel 769 of 1275, Community Panel Number 065043 0769 C. Washington, D.C.

Federal Register. 1981(March 23). Council on Environmental Quality, Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations.

Finnemore, P. Fall 2000 and winter 2001. Personal communications by telephone with Chris Davis, NPS, Denver, CO. Project Manager, U.S. Army Corps of Engineers. Los Angeles, CA.

Greenwood and Associates. 2000. *History of Solstice Canyon (draft)*. Prepared for the National Park Service as historical background for evaluation of National Register of Historic Places significance for Solstice Canyon properties. Pacific Palisades, CA.

Hickman, J.C. (editor). 1993. *The Jepson Manual, Higher Plants of California*. University of California Press. Berkeley, CA.

Holland, R.F. 1986. *Preliminary Descriptions of the Terrestrial Natural Communities of California*. California Department of Fish and Game. Sacramento, CA.

King, C. 2000. *Native American Indian Cultural Sites in the Santa Monica Mountains*. Prepared for the Santa Monica Mountains and Seashore Foundation, under cooperative agreement with the National Park Service (Pacific West Region, and Santa Monica Mountains National Recreation Area). Topanga Anthropological Consultants, Topanga, CA.

Klecha, T. January 31, 2001. Personal communication by telephone with Chris Davis, NPS, Denver, CO. Environmental Specialist, Los Angeles Regional Water Quality Control Board. Los Angeles, CA.

Lohmus, N. Fall 2000 and winter 2001. Personal communications by telephone with Chris Davis, NPS, Denver, CO. Biologist, California Department of Fish and Game. Santa Barbara, CA.

Meyers, M. February 5, 2001. Personal communication by telephone with Chris Davis, NPS, Denver, CO. Plant Ecologist, California Department of Fish and Game. Ojai, CA.

Minnesota Pollution Control Agency. 1999 (revised). *A Guide to Noise Control in Minnesota: Acoustical Properties, Measurement, Analysis, and Regulation*. Saint Paul, MN.

National Park Service. 1998. *Solstice Canyon Design Charette*. Denver Service Center. Denver, CO.

National Park Service. 1999. *Evaluation of the Effects of Five Mass Transit Alternatives on the Natural Resources of Grand Canyon National Park*. Grand Canyon National Park Science Center. Grand Canyon National Park, AZ.

National Park Service. 2000a. *Draft General Management Plan and Environmental Impact Statement, Santa Monica Mountains National Recreation Area*. Santa Monica Mountains National Recreation Area. Thousand Oaks, CA.

National Park Service. 2000b. Management Policies. U.S. Department of the Interior. Washington, D.C.

National Park Service. 2000c. Value Analysis Study for Rehabilitate Facilities at Solstice Canyon, Package 364, Santa Monica Mountains National Recreation Area, Value Analysis Study 102-00. Denver Service Center. Denver, CO.

National Park Service. 2001. Solstice Creek Fish Passage and Riparian Restoration Project (Revised) Grant Application to the California Coastal Conservancy, Southern California Wetlands Recovery Project. Santa Monica Mountains National Recreation Area. Thousand Oaks, CA.

Raives, J. February 2, 2001. Personal communication by telephone with Chris Davis, NPS, Denver, CO. Senior Analyst, California Coastal Commission. San Francisco, CA.

Spina, A. August 8 and December 14, 2000. Personal communication by telephone with Chris Davis, NPS, Denver, CO. Fisheries Biologist, National Marine Fisheries Service. Long Beach, CA.

U.S. Army Corps of Engineers. 1987. Wetlands Delineation Manual. Waterways Experiment Station. Vicksburg, MS.

U.S. Fish and Wildlife Service. 1979. Classification of Wetlands and Deepwater Habitats of the United States. Office of Biological Services. Washington, D.C.

U.S. Fish and Wildlife Service. 1988. National List of Plant Species that Occur in Wetlands: California (Region 0). Biological Report 88(26.10). National Ecology Research Center. St. Petersburg, FL.

U.S. Fish and Wildlife Service. 1998 (March). Final Endangered Species Consultation Handbook, Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act. Published jointly by the National Marine Fisheries Service. Washington, D.C.

U.S. Fish and Wildlife Service. 2001 (March 13). Endangered and Threatened Wildlife and Plants; Final Determinations of Critical Habitat for the California Red-legged Frog; Final Rule. Federal Register, Volume 66, Number 49, Pages 14625-14674.

Wasner, A. February 6, 2001. Personal communication by facsimile with Chris Davis, NPS, Denver, CO. Soils Taxonomist, Natural Resources Conservation Service, Santa Monica Mountains National Recreation Area. Thousand Oaks, CA.

LIST OF PREPARERS

| PREPARER: | ROLE: | POSITION: |
|---|--|------------------------------|
| Chris Davis NPS-DSC, Lakewood, CO | Report preparation and coordination | Natural Resource Specialist |
| Steve Whissen NPS-DSC, Lakewood, CO | Preparation of cultural resource sections | Cultural Resource Specialist |

CONSULTANTS:

NPS-PGSO, San Francisco, CA:

Stu Bussian, Landscape Architect
Robbyn Jackson, Historical Architect
Roger Kelly, Archeologist
Alan Schmierer, Regional Compliance
 Coordinator

NPS-DSC, Lakewood, CO:

Ric Alesch, Project Manager
Gary Hurrelle, Job Captain
Lydia Kreger, Civil Engineer

NPS-SAMO, Thousand Oaks, CA:

Arthur E. Eck, Superintendent
Phil Holmes, Cultural Anthropologist
Leslie Jehnings, Landscape Architect
Ray Sauvajot, Chief of Planning,
 Science, and Resource Management
Woody Smeck, Assistant
 Superintendent
John Tizler, Plant Ecologist